KV-13TR21
RM-729

SERVICE MANUAL

US Model

Chassis No. SCC-A81X-A

P-3 CHASSIS

Note: The service manual for RM-729 has been issued separately.

MODELS OF THE SAME SERIES	
KV-13TR21	
KV-1392R/1393R	

SPECIFICATIONS

Television system	American TV standards
Channel coverage	VHF: channels 2–13 UHF: channels 14–69 Cable TV channels 1–125
Picture tube	Trinitron tube **13-inch picture measured diagonally** 14-inch picture tube measured diagonally 90-degree deflection
Inputs video	1V p-p, 75 ohms unbalanced, sync. negative
audio	408 mV rms (100% modulation, 47 kilohms)
Output	Earphone jack (minijack)
Power requirements	120 V AC, 60 Hz
Power consumption	97 W
Accessories supplied	VHF/UHF telescopic dipole antenna AN-18 (1) Antenna connector (1) Remote Commander RM-729 with 2 size AA batteries
Optional accessories	U/V mixer EAC-66 Connecting cables VMC-606M/607M etc.

Design and specifications are subject to change without notice.

MICROFILM

TRINITRON® COLOR TV

SONY®

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WARNING !!

AN ISOLATION TRANSFORMER SHOULD BE USED DURING ANY SERVICE TO AVOID POSSIBLE SHOCK HAZARD, BECAUSE OF LIVE CHASSIS.
THE CHASSIS OF THIS RECEIVER IS DIRECTLY CONNECTED TO THE AC POWER LINE.

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Check that all control knobs, shields, covers, ground straps, and mounting hardware have been replaced. Be absolutely certain that you have replaced all the insulators.
4. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
5. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
6. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
7. Check the condition of the monopole antenna (if any).
   Make sure the end is not broken off, and has the plastic cap on it. Point out the danger of impalement on a broken antenna to the customer, and recommend the antenna's replacement.
8. Check the B+ and HV to see they are at the values specified. Make sure your instruments are accurate; be suspicious of your HV meter if sets always have low HV.
9. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

HOW TO FIND A GOOD EARTH GROUND

A cold-water pipe is guaranteed earth ground; the cover-plate retaining screw on most AC outlet boxes is also at earth ground. If the retaining screw is to be used as your earth-ground, verify that it is at ground by measuring the resistance between it and a cold-water pipe with an ohmmeter. The reading should be zero ohms. If a cold-water pipe is not accessible, connect a 60–100 watts trouble light (not a neon lamp) between the hot side of the receptacle and the retaining screw. Try both slots, if necessary, to locate the hot side of the line, the lamp should light at normal brilliance if the screw is at ground potential. (See Fig. B)

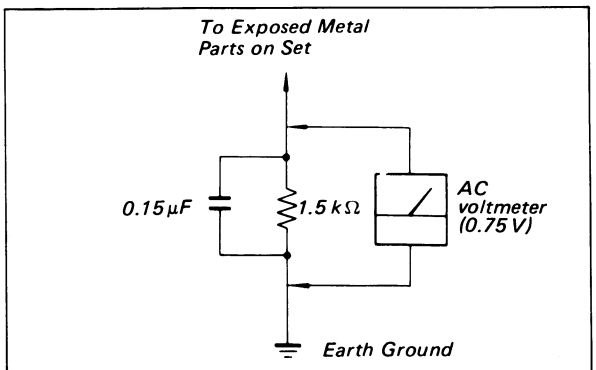


Fig. A. Using an AC voltmeter to check AC leakage.

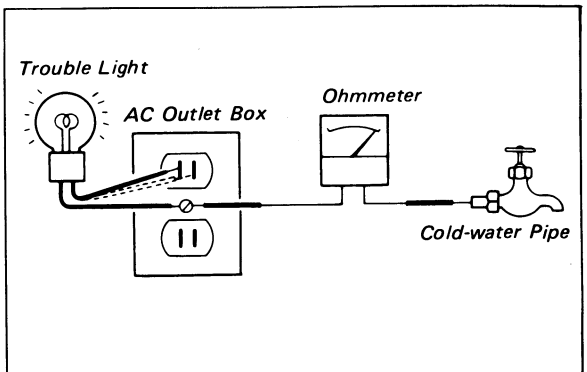
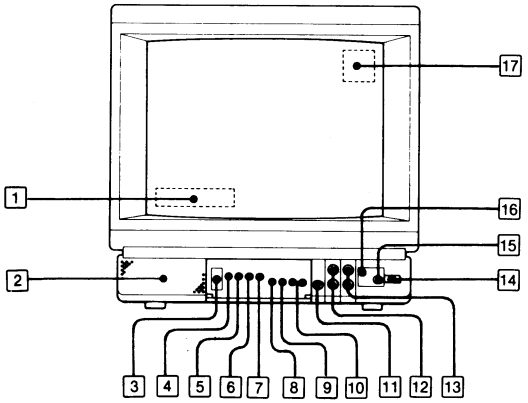


Fig. B. Checking for earth ground.

SECTION 1
GENERAL

1-1. LOCATION AND FUNCTION OF CONTROLS

Front



1 **Bar display**
Indicates level of volume and picture contrast.

2 **Speaker**

3 **Earphone jack (minijack)**

4 **BRIGHT (brightness) control**
Turn clockwise for more brightness or counterclockwise for less.

5 **COLOR control**
Turn clockwise for more color intensity or counterclockwise for less.

6 **HUE control**
Turn clockwise to make the tones greenish or counterclockwise to make them purplish.

7 **CABLE selector**
To view CATV programs, set this selector to ON.

8 **ERASE button**
Used for channel presetting. Press to erase channels.

9 **ADD button**
Used for channel presetting. Press to add channels.

10 **PICTURE buttons**
Press PICTURE "+" to increase picture contrast, or "–" to decrease it.

11 **TV/VIDEO button**
Press to view the picture from the connected VCR.

12 **VOLUME buttons**
Press VOL "+" to increase volume, or "–" to decrease it.

13 **CHANNEL scan buttons**
Press "+" for higher-numbered channels and "–" for lower-numbered channels.

14 **POWER switch**
Press to turn the unit on.

15 **Remote control detector**
Point the Remote Commander towards this detector.

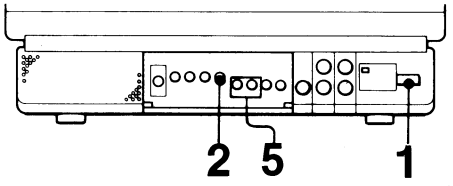
16 **SLEEP lamp**
Lights up when the SLEEP button on the Remote Commander is pressed.

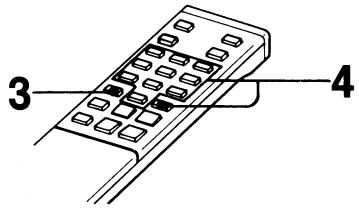
17 **On-screen display**
Shows channel numbers, "MUTING", and "SLEEP" indications.

1-2. PRESETTING CHANNELS

By adding and erasing channels, you can preset your TV so that only the desired channels appear in sequence when the CH "+" or "–" is pressed.

Receivable channels of your unit are:
VHF: 2–13 UHF: 14–69 CATV: 1–125





PREPARATION

1 POWER

Press POWER on the TV.

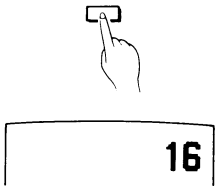
2 OFF ON

CABLE

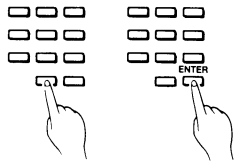
Set the CABLE selector to:
ON for CATV channels
OFF for VHF/UHF channels

ADDING AND ERASING CHANNELS

3 Press DISPLAY to make the channel number appear.

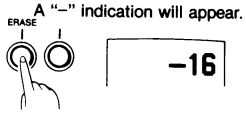


4 Press the number(s) of the channel to be added or erased, then press ENTER.



5 To add, press ADD.
A "+" indication will appear.

To erase, press ERASE.
A "–" indication will appear.



Repeat steps **4** and **5** for other channels to be added or erased. To add erased channels again, repeat the steps in adding.

Note
If you erase a VHF or UHF channel, the cable TV channel with the same number will also be erased, and vice versa.

CABLE TV CHANNEL CHART*

Cable TV systems use letters or numbers to designate channels. To tune in a channel, refer to this chart.

Check with your local cable TV company for more complete information on the available channels.

Number on this TV	1	5	6	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Corresponding CATV channel	A–8	A–7	A–6	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q

31	32	33	34	35	36	37	38	39	.....	93	94	95	96	97	98	99	100	101	102	.....	123	124	125
R	S	T	U	V	W	W+1	W+2	W+3	.....	W+57	W+58	A–5	A–4	A–3	A–2	A–1	W+59	W+60	W+61	.....	W+82	W+83	W+84

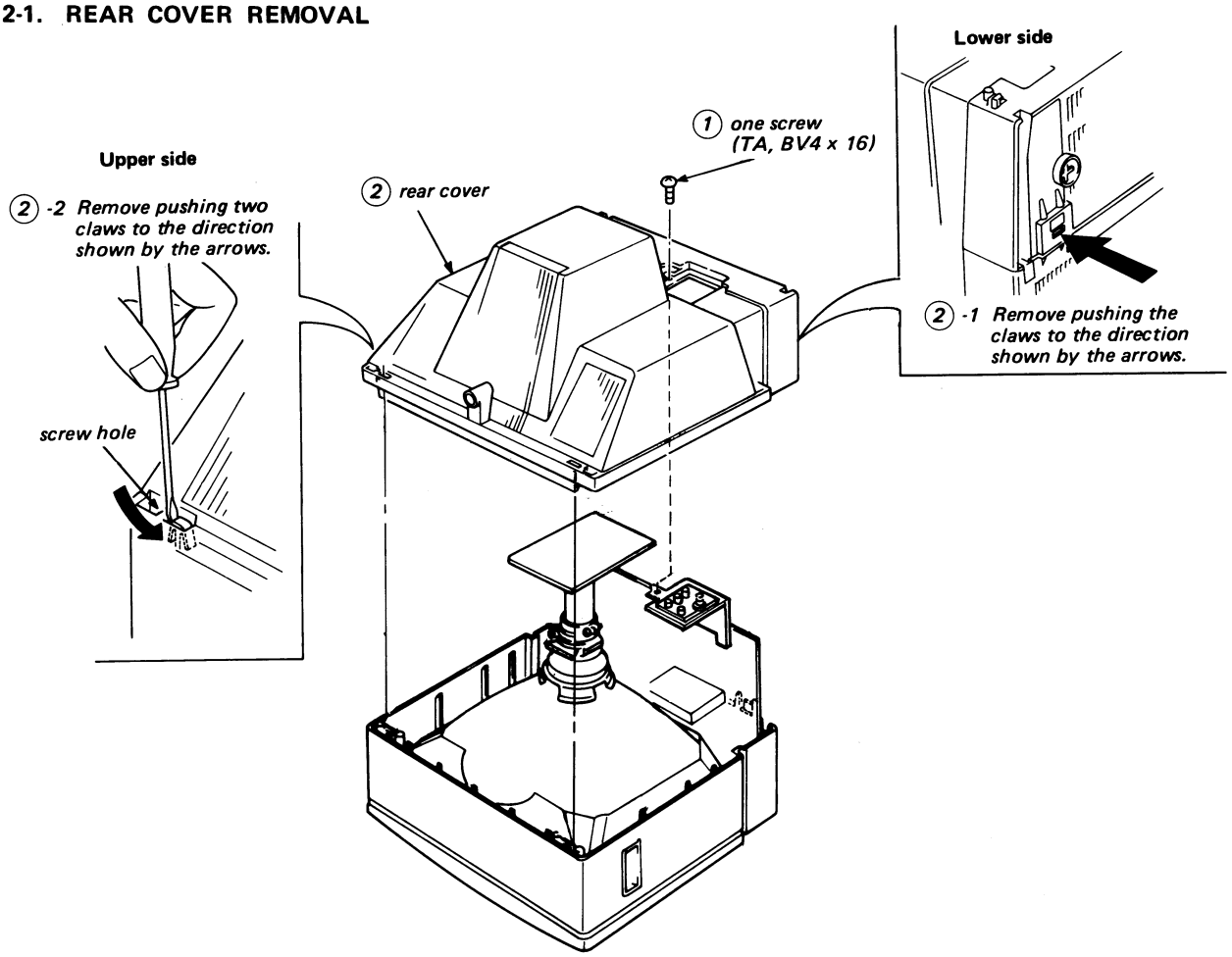
*The designation of the cable TV channels conforms to the EIA/NCTA recommendation.

Note
Pay cable TV systems use scrambled or encoded signals and require special converters (decoders) in addition to the normal cable connection.

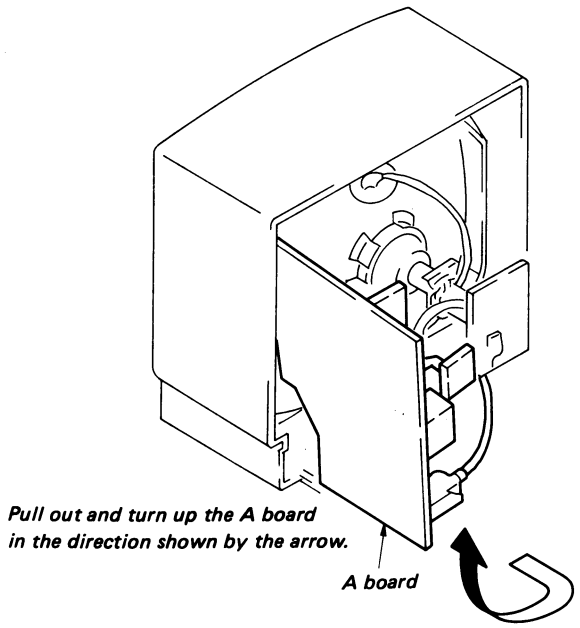
SECTION 2
DISASSEMBLY

Note: *Follow the disassembly procedure in the numerical order given.*

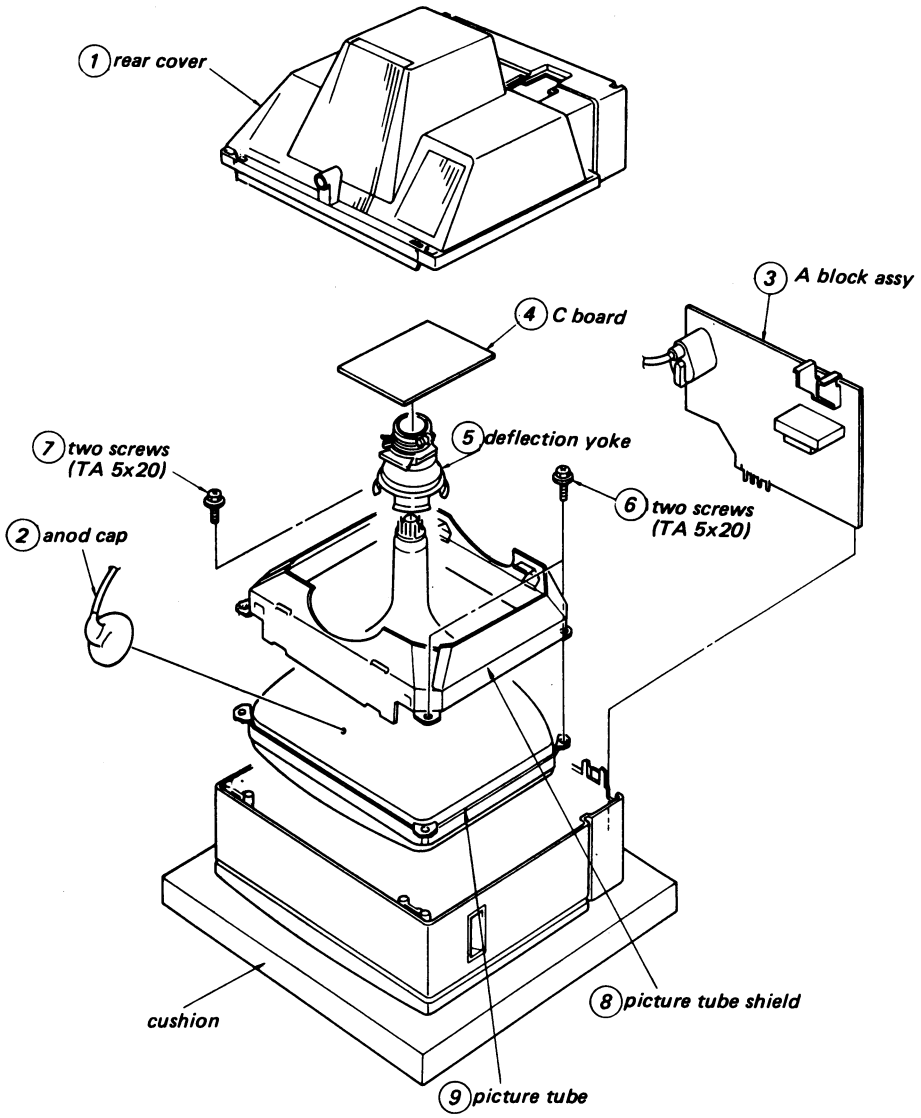
2-1. REAR COVER REMOVAL


Lower side
(1) one screw
(TA, BV4 x 16)
Upper side
(2) -2 Remove pushing two claws to the direction shown by the arrows.
(2) rear cover
(2) -1 Remove pushing the claws to the direction shown by the arrows.
screw hole

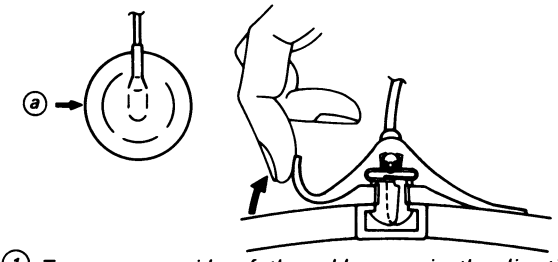
2-2. SERVICE POSITION



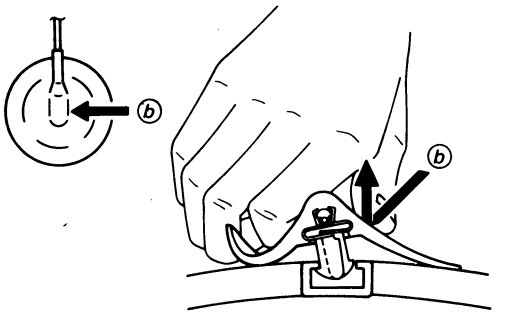
2-3. PICTURE TUBE REMOVAL



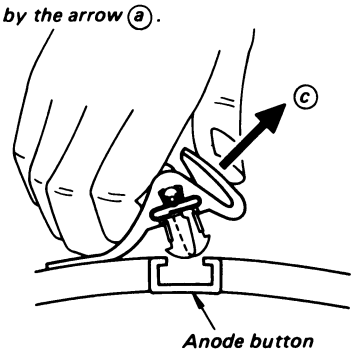
- **Removing Procedures**



(1) *Turn up one side of the rubber cap in the direction indicated by the arrow (a).*



(2) *Using a thumb, pull up the rubber cap firmly in the direction indicated by the arrow (b).*



(3) *When one side of the rubber cap is separated from the anode button, the anode cap can be removed by turning up the rubber cap and pulling up it in the direction of the arrow (c).*

SECTION 3
SET-UP ADJUSTMENTS
(Adjusting Magnetizing-system ITC Picture Tube for Repair)

The magnetizing-system ITC (Integrated Tube Component) does not have a function to adjust the purity static convergence. Therefore, the cylindrical magnet attached to the deflection yoke has to be replaced with a 2.4.6-pole magnet at the same time when a picture tube is replaced.

The replacement and adjusting methods are described below.

- These adjustments should be performed with rated power supply voltage unless otherwise noted.
- Controls and switch should be set as follows unless otherwise noted:
  PICTURE control . . . . . normal position
  BRIGHTNESS control . . . . . click position

Perform the adjustments in order as follows:

1. Beam Landing
2. Convergence
3. Focus
4. White Balance

Note: Test Equipment Required.
1. Color-bar/Pattern Generator
2. Degausser
3. Oscilloscope
4. Digital multimeter

Preparations

1. Remove the clamping band from the deflection yoke and dismount the cylindrical magnet.
2. Mount the replacement parts and clamping band, which are contained in the package box containing the picture tube, in the position from which the cylindrical magnet was removed. (See Fig. 3-1.)

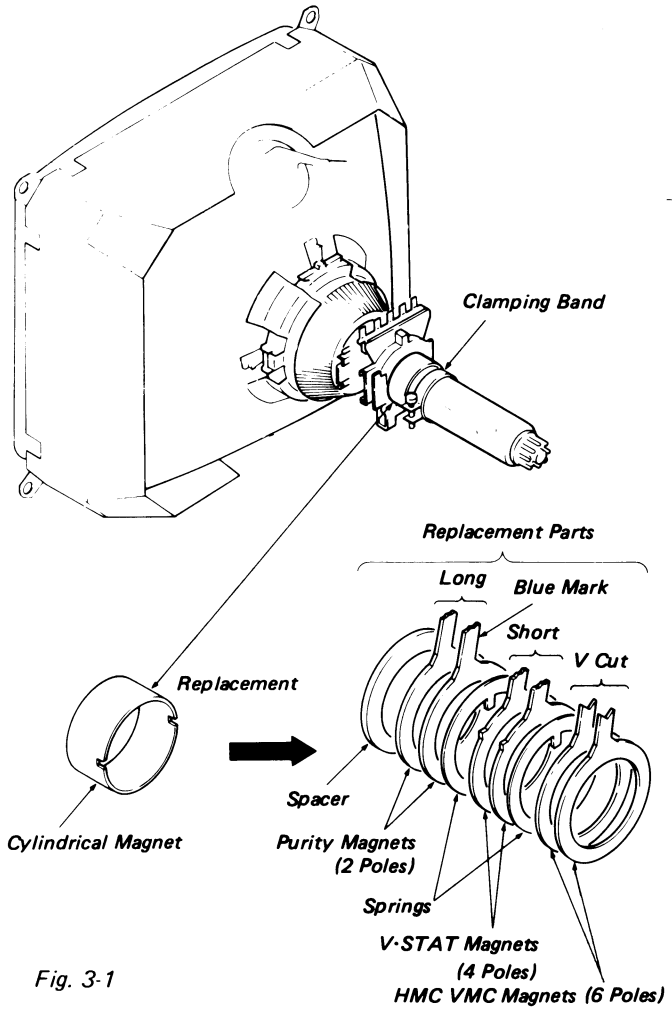


Fig. 3-1

3. Insert the deflection yoke into the picture tube.

3-1. BEAM LANDING

1. Face the set picture tube surface toward east or west to reduce the effects of terrestrial magnetism.
2. Reduce the magnetism of each correction magnet in the replacement parts to zero field. (See Fig. 3-2.)

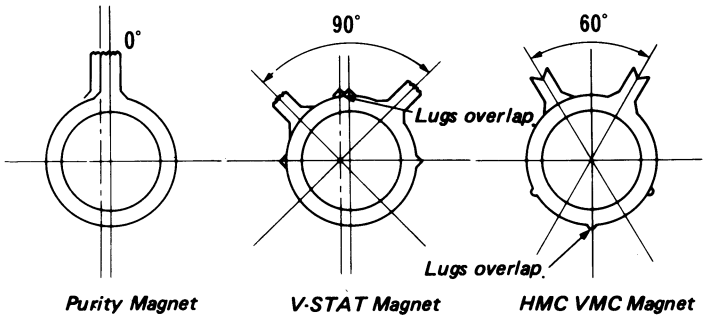


Fig. 3-2

3. Receive an all-white signal using a pattern generator.
4. Turn the set POWER switch on and demagnetize using a degausser.
5. Rotate the PICTURE control to NORMAL and the BRIGHTNESS control to the CLICK position.
6. Roughly adjust the white balance, screen, and convergence.
7. Rotate the red BKG VR (RV701) to the maximum position and the green and blue BKG VRs to the minimum positions.
8. Slide the deflection yoke backward to show red in the picture center and adjust the purity magnet to obtain a horizontal symmetry. (See Figs. 3-3, 3-4, and 3-5.)
9. Slide the deflection yoke forward to show red only throughout the picture.
10. Substitute green, then blue for red in step 7 and check landing.
11. Rotate red, green and blue once each and check landing.

12. Correct with the magnet if the landing in the corners cannot be adjusted. (See Fig. 3-5.)
13. Clamp the clamping band to fix the deflection yoke after deciding its position.

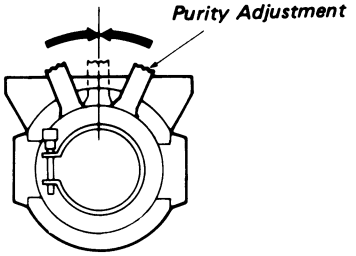


Fig. 3-3

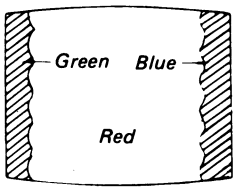


Fig. 3-4

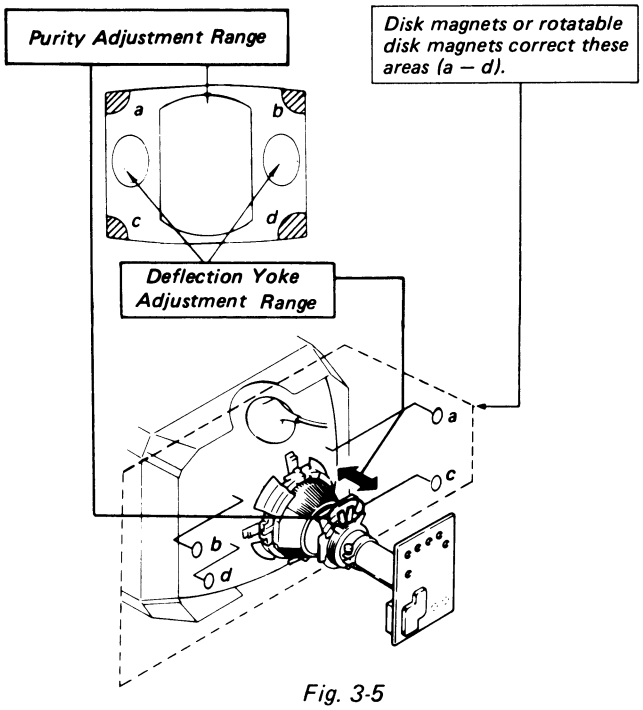


Fig. 3-5

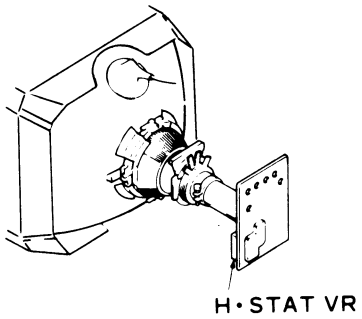


Fig. 3-6

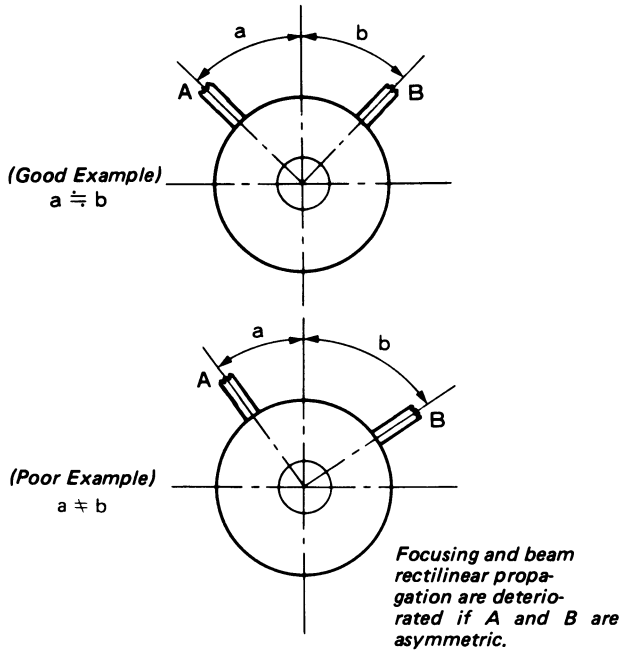


Fig. 3-7

3-2. CONVERGENCE

Preparation:

Roughly adjust the V·SIZE and focus.

(1) Horizontal and Vertical Static Convergence

1. Receive a dot signal using a pattern generator.
2. Rotate the BRIGHTNESS control to the minimum position and the PICTURE control to NORMAL.
3. Overlap the R and B dots in a horizontal direction in the center of the picture using the H·STAT VR knob. (See Fig. 3-6.)
4. Overlap the R and B dots in a vertical direction in the center of the picture using the V·STAT magnet (4-pole ring magnet). (See Fig. 3-7.)
5. Overlap the R and B•G dots in horizontal and vertical directions in the center of the picture using the HMC and VMC magnets (6-pole ring magnets). Adjust the correction amounts of the R and B•G dots by the opening angle of the magnets. Adjust the direction by rotating the two magnets simultaneously. (See Fig. 3-8.)

NOTE: If the H·CENT tap is changed over after adjusting H·STAT, readjust H·STAT.

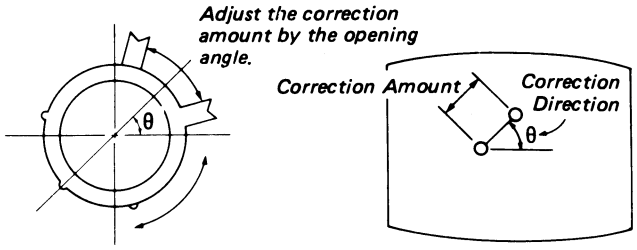

Adjust the correction amount by the opening angle.
θ
Correction Amount
Correction Direction
θ
Adjust the correction direction by rotating the two magnets simultaneously.

Fig. 3-8

(2) Dynamic Convergnece Adjustment

Preparation:

Before stating, perform Horizontal and Vertical Static Convergence Adjustment.

1. Loosen the Clamping Band of deflection yoke.
2. Adjust the cross tilt misconvergence at the H and V axis ends in the picture to the best condition by oscillating the deflection yoke. (See Fig. 3-9.)

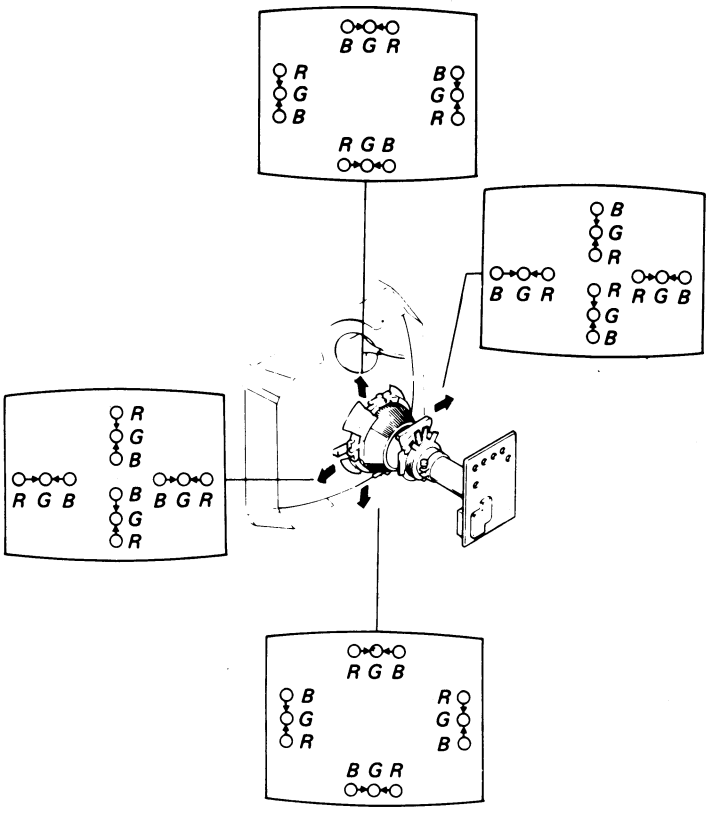


Fig. 3-9

3. Fix the deflection yoke by driving three wedges between the deflection yoke and picture tube funnel.
4. Correct with Permalloy if the peripheral convergence cannot be corrected. (See Fig. 3-10.)

- Paint-lock each magnet after finishing adjustment so that the magnets can not move.

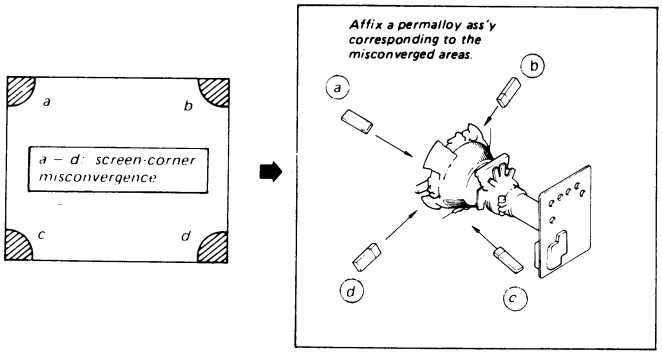


Fig. 3-10

3-3. FOCUS ADJUSTMENT

Adjust FOCUS control (RV707) for a best picture.

3-4. WHITE BALANCE ADJUSTMENT

[SCREEN (G2)]

1. Receive a dot signal using a pattern generator.
2. Rotate the BRIGHTNESS control to the minimum position and the PICTURE control to NORMAL.
3. Adjust BKG VRs (RV701, RV703, and RV705) so that voltages on the red, green and blue cathodes are 160 V dc with an oscilloscope as shown in Fig. 3-11.
4. Observe the screen and adjust SCREEN (RV706) to obtain the faintly visible background of dot signal. Note the color that first becomes visible by turning SCREEN VR.

   Do not turn a BKG control for this color.

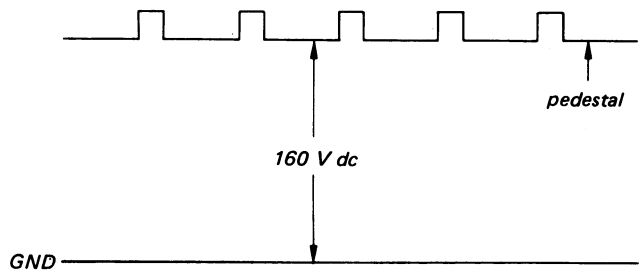
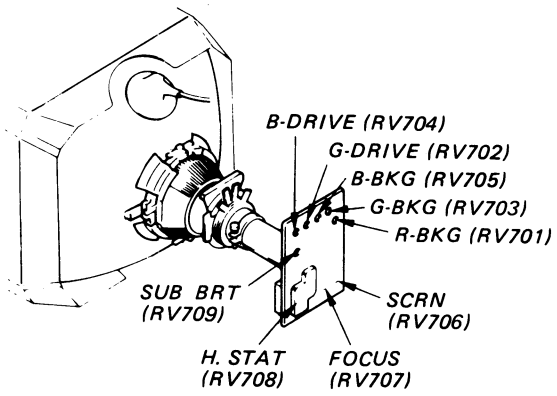


Fig. 3-11

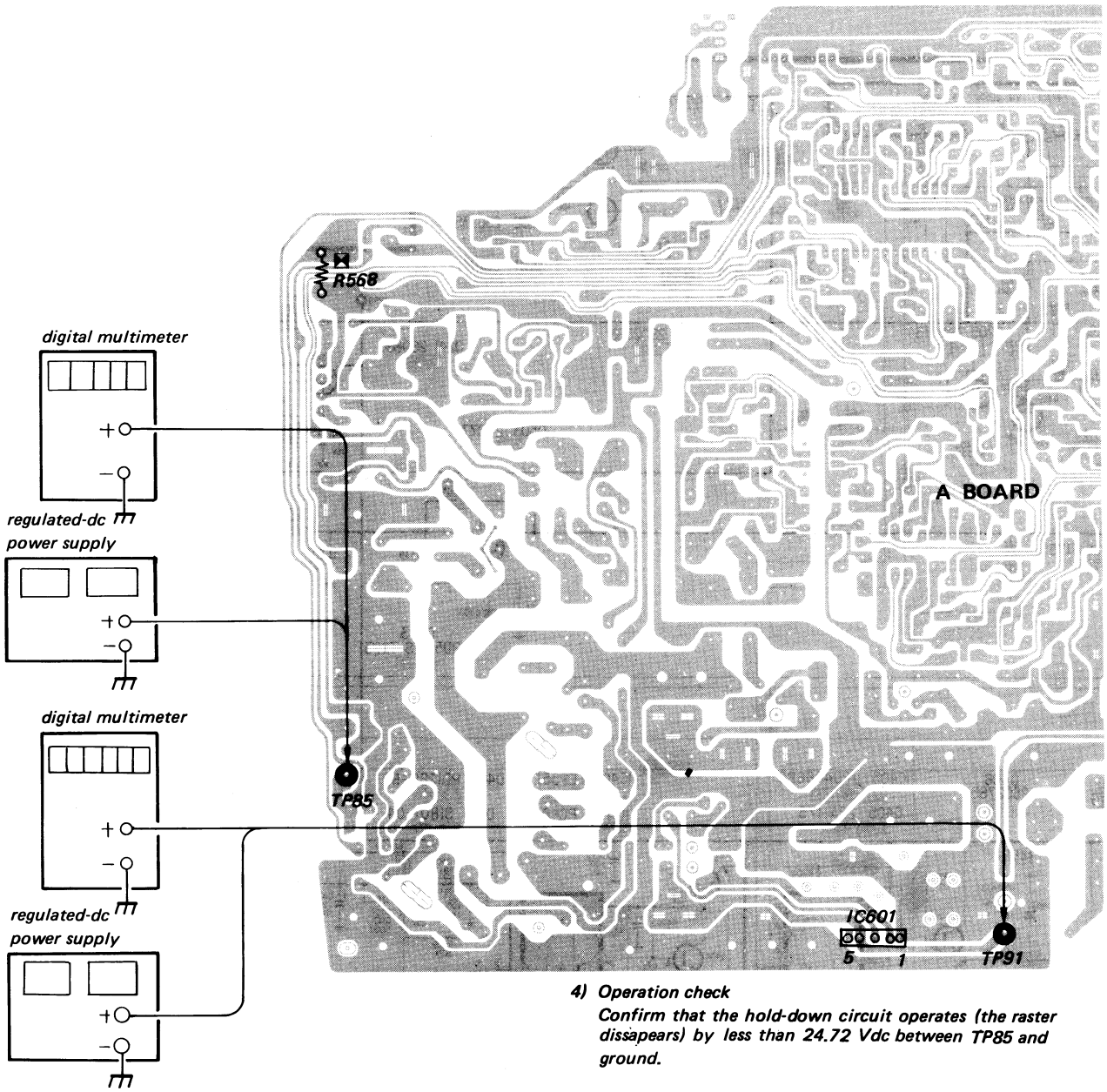
[WHITE BALANCE]

1. Receive an all-white signal using a pattern generator.
2. Rotate the PICTURE control to NORMAL and the BRIGHTNESS control to the CLICK position.
3. Observe the screen and adjust the other two BKG VRs for best white balance.
4. Rotate the PICTURE control to maximum.
5. Observe the screen and adjust the DRIVE VRs (RV702, RV704) for best white balance.
6. Repeat steps 2 through 5 several times.



SECTION 4
SAFETY RELATED ADJUSTMENTS

4-1. SAFETY RELATED ADJUSTMENT

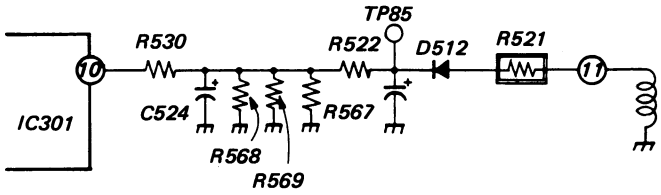


■ R568 (ADJUSTMENT (HOLD DOWN)

When replacing the following components (marked) with ■ on the schematic diagram) perform the adjustment as follows.

■	R568
◪	C307, C524, C525, D502, D512, IC301, R521, R522, R530, R534, R567, R568, R569. T503 (FBT)

1) *Receive the dot signal*
   PICTURE VR ..... MIN
   BRIGHT VR ..... MIN
2) *+B voltage check*
   Confirm that the +B voltage (135V LINE) is less than 136.33V dc during input of $130^{+3.0}_{-0}$ V ac.
3) *Protector voltage check*
   Confirm that a voltage of 20.30±1.50V dc appears between TP85 and ground during input of 120±2.0 ac.
4) *Operation check*
   Confirm that the hold-down circuit operates (the raster dissapears) by less than 24.72 Vdc between TP85 and ground.



** Use a digital multimeter whose input impedance is over 100MΩ when confirming the voltage of TP85.*

CHECK AFTER IC601 REPLACEMENT

1) *Supply $130^{+3.0}_{-0}$ V ac to with variable autotransformer.*
2) *Receive the dot signal.*
3) *PICTURE VR ..... MIN*
   BRIGHT VR ..... MIN
4) *Confirm that the +B voltage (at TP91) less than 136.33 V dc.*
5) *If step 4 is not satisfied, replace IC601 in A board and repeat above steps.*

SECTION 5
CIRCUIT ADJUSTMENTS

5-1. A BOARD ADJUSTMENT

Note: (1) TEST EQUIPMENT REQUIRED

1. Oscilloscope
2. Digital multimeter
3. Color-bar/pattern generator
4. Variable auto-transformer
5. Isolation transformer
6. Frequency counter

(2) INPUT SIGNAL

When making these adjustments, supply a color-bar or an off-air signal.

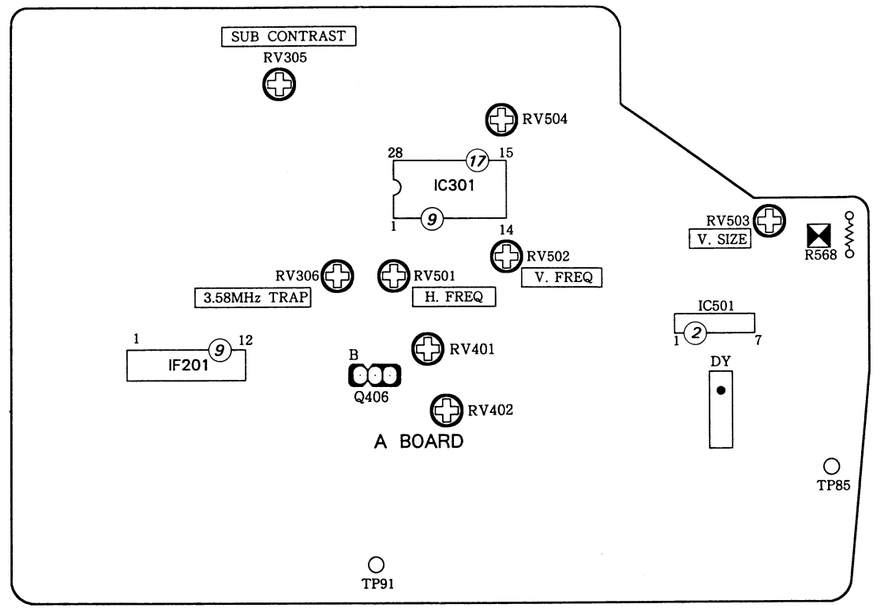
(3) CONTROL SETTING

Controls and switches should be set as follows when making checks and adjustments unless otherwise noted.

PICTURE control, COLOR control } initial setting
V. HOLD control ..... set for stable picture
BRIGHT control . . . . . set for best picture

(4) These adjustments should be performed with the rated power supply voltage unless otherwise noted.

– component side –



V SIZE (RV503)

1. *Tune in an off-air signal.*
2. *Adjust V SIZE VR (RV503) for a best vertical size picture.*

V-FREQUENCY (RV502)

1. *Switch to a channel where no signal is received.*
2. *Connect a frequency counter across pin (2) of IC501 and ground.*
3. *Adjust V-FREQUENCY VR (RV502) to obtain 55Hz ± 0.5Hz reading on the frequency counter.*

H-FREQUENCY (RV501)

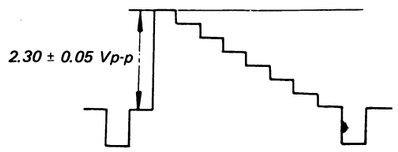
1. *Tune in an off-air signal.*
2. *Set the PICTURE and BRIGHT control to obtain a suitable picture.*
3. *Connect an digital multimeter across pin (9) of IC301 and ground.*
4. *Adjust H FREQUENCY VR (RV-501) to obtain 3.2±0.1 V dc reading on the digital multimeter.*

V.BIAS (RV503, RV504)

1. *Tune in an off-air signal.*
2. *Adjust VSIZE VR (RV503) for a best vertical SIZE.*
3. *Adjust V BIAS VR (RV504) so that voltage of V, deflection yoke connector (grounded side) is 12.0 ± 0.2 V dc.*
4. *Confirm V-SIZE adjustment.*

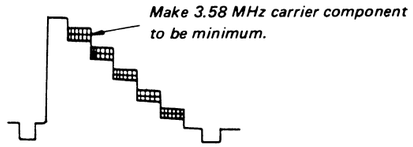
SUB CONTRAST (RV305)

1. *Receive color bar signal.*
2. *PICTURE VR . . . . . .maximum*
   BRIGHT VR . . . . . .center click
   COLOR VR . . . . . .minimum
   HUE VR . . . . . .center
3. *Connect an oscilloscope across pin (17) of IC301.*
4. *Adjust RV305 to 2.30 ± 0.05 Vp-p*



3.58 MHz TRAP (RV306)

1) *Receive color bar signal.*
2) *PICTURE VR . . . . . .maximum*
   BRIGHT VR . . . . . .center click
   COLOR VR . . . . . .minimum
   HUE VR . . . . . .center
3) *Adjust RV-306 until the 3.58 MHz component in Y out waveform at pin (17) of IC301 becomes a minimum as shown below.*

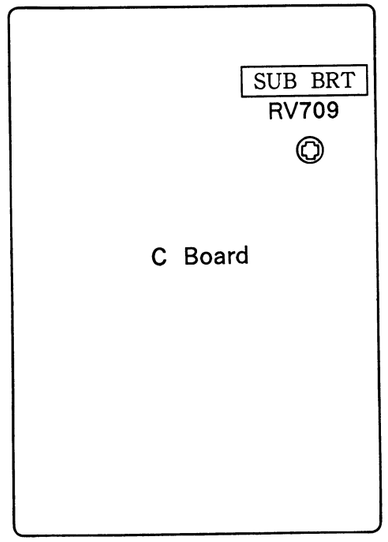


AV LEVEL ADJUSTMENT (RV401, RV402)

1. *Connect an oscilloscope to the base of Q406.*
2. *Input a color-bar signal*
   (RF: color-bar 87.5% TV modulation)
   (VIDEO color-bar 1Vp-p 75Ω.
3. *Turn the TV/VIDEO select switch ON or OFF, and adjust RV401 so that the signal levels of TV and VIDEO are same.*
4. *Connect an oscilloscope to the pin (9) of IF201.*
5. *Input a dot-signal.*
   (RF: dot signal AUDIO 400 Hz (100% modulation)
   (AUDIO: 400 Hz-5.6 dBs (0.408 Vrms)
6. *Turn the TV/VIDEO select switch ON or OFF and adjust RV402 so that the signal levels of TV and AUDIO are same.*

5-2. C BOARD ADJUSTMENTS

– component side –



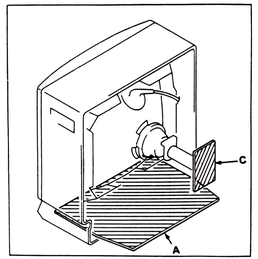
SUB BRT (RV709)

1. *Receive a broadcast.*
2. *Set the PICTURE control at minimum and turn the BRIGHT knob for optimum picture.*
3. *Adjust RV709 for optimum brightness.*
4. *Set the PICTURE button for best picture.*
5. *Receive each channel and check that there are no extremes of brightness.*

KV-13TR21 RM-729 KV-13TR21 RM-729

SECTION 6
DIAGRAMS

6-1. CIRCUIT BOARDS LOCATION



Note:

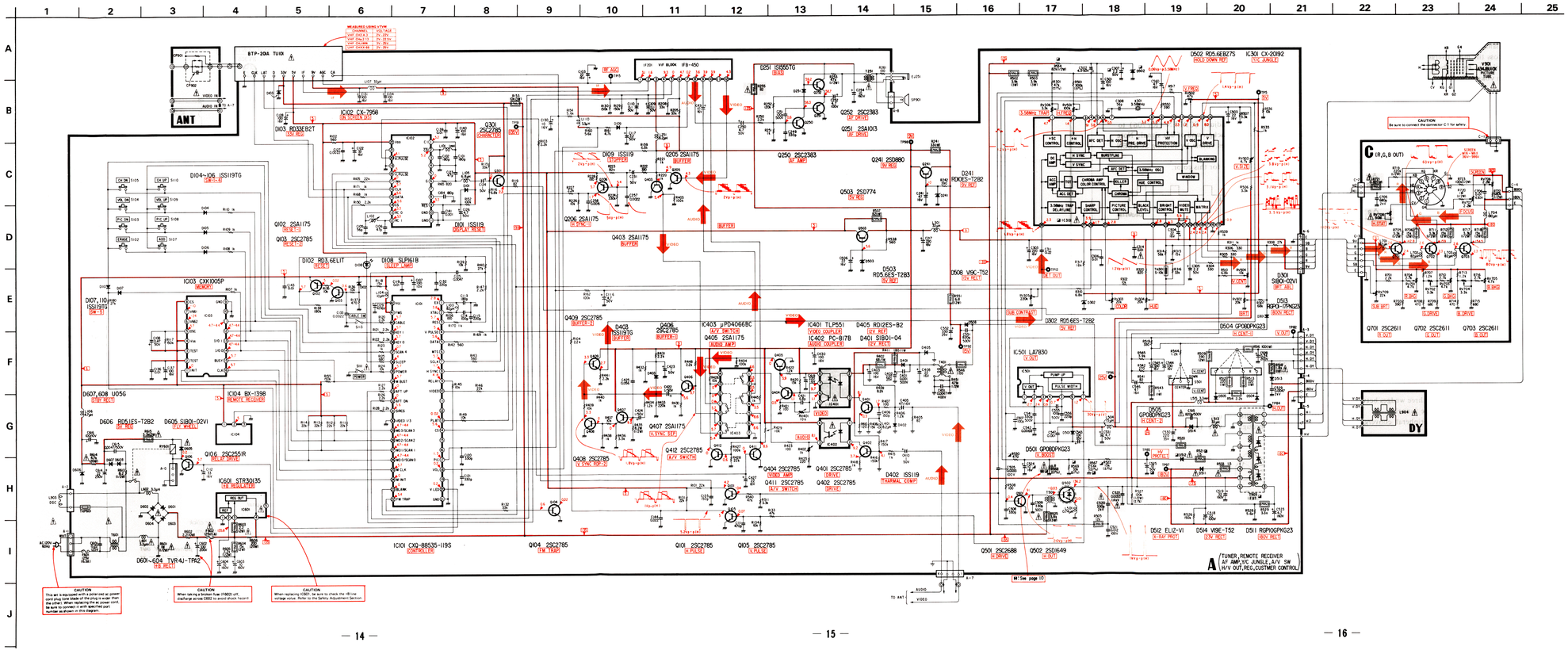
- All capacitors are in μF unless otherwise noted. 50WV or less are not indicated except for electrolytics. P: μμF
- All resistors are in ohms, ¼ W unless otherwise noted. k: 1000Ω, M: 1000kΩ
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : panel designation.
- When replacing components identified by ◪, make the necessary adjustments indicated. If results do not meet the specified value, change the component identified by ◪ and repeat the adjustment until the specified value is achieved. (Refer to R568 adjustment on page 10.) When replacing the part in below table, be sure to perform the related adjustment.

Part replaced (◪)	Adjustment (◨)
C307, C524, C525, D502, D512, IC301, R521, R522, R530, R534, R567, R568, R569, T503 (FBT)	R568

- : adjustment for repair.
- All voltage are in V
- ———— : B+ Line
- ———— : B– Line
- Voltages are dc with respect to ground unless otherwise noted.
- Reading are taken with a 10 MΩ digital multimeter.
- Readings are taken with a color-bar signal input.
- ➡ : Signal path.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

6-2. SCHEMATIC DIAGRAM


ANT
IC102 CX-7958
ON SCREEN DISP
IC103 CXK1005P
MEMORY
IC104 BX-1398
REMOTE RECEIVER
IC101 CXQ-88535-119S
CONTROLLER
IC401 TLP551
VIDEO COUPLER
IC402 PC-817B
AUDIO COUPLER
IC403 μPD4066BC
A/V SWITCH
AUDIO AMP
IC501 LA7830
V. OUT
IC502 STR30135
+B REGULATOR
IC301 CX-20192
VIDEO JUNGLE
A (TUNER, REMOTE RECEIVER AF AMP, I2C JUNGLE, A/V SW I/A/V OUT, REG, CUSTMER CONTROL)
B (R,G,B OUT)
C (R,G,B OUT)
DY
CAUTION
This set is equipped with a polarized ac power cord plug (one blade of the plug is wider than the other). When replacing the ac power cord, be sure to connect it with specified part number as shown in this diagram.
CAUTION
When replacing T501, be sure to discharge across C602 to avoid shock hazard.
CAUTION
When replacing Q501, be sure to check the +B line voltage value. Refer to the Safety Adjustment Section.
CAUTION
Be sure to connect the connector C-1 for safety.
MEASURED USING VTVM
CHANNEL VOLTAGE
VHF CH2-3 3V -20%
VHF CH4-13 5V -20%
UHF CH14-69 5V -20%
CATV CH58-68 5V -20%
TO ANT
AUDIO
VIDEO
See page 10

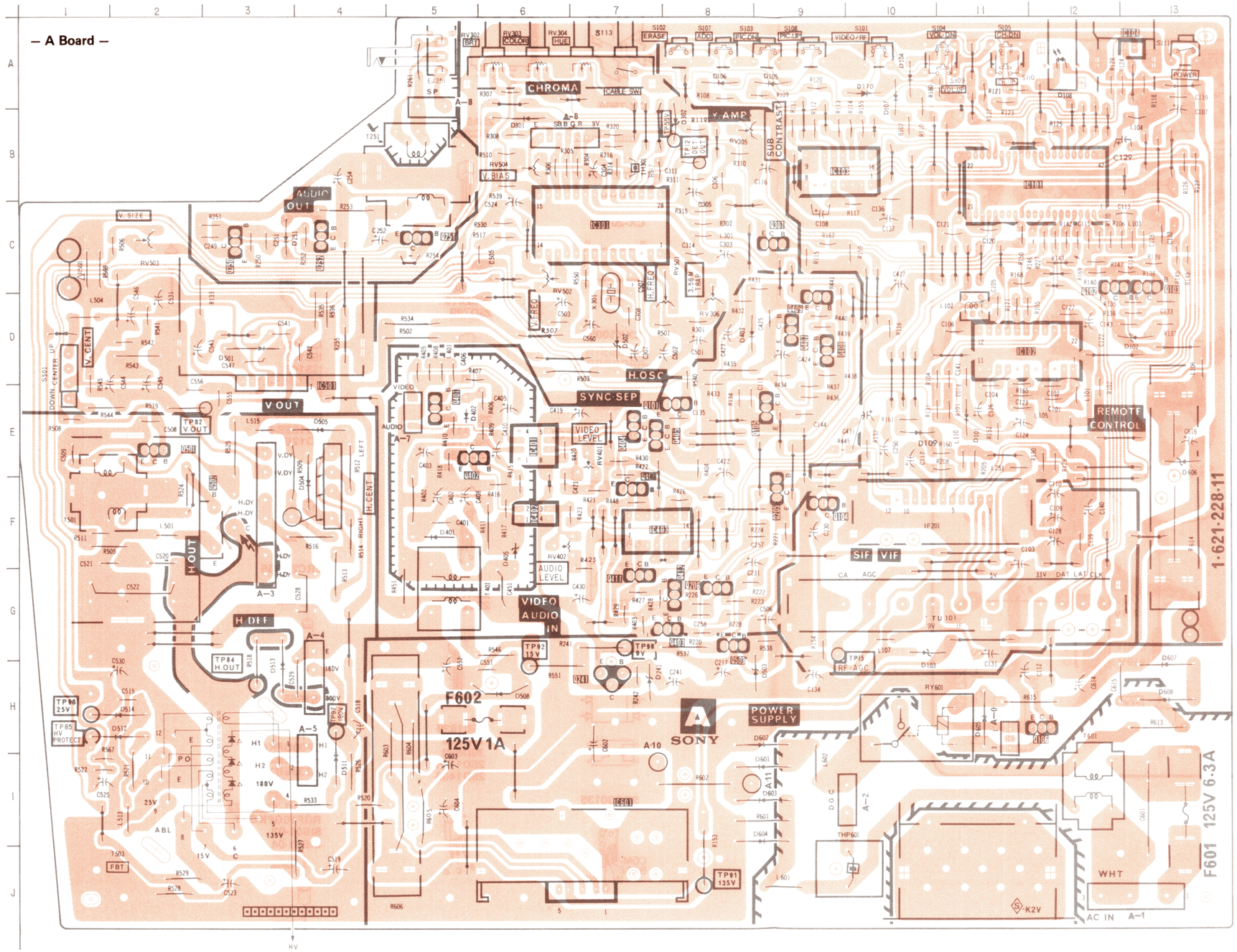
KV-13TR21 RM-729	KV-13TR21 RM-729
TUNER, REMOTE RECEIVER AF AMP, Y/C JUNGLE, A/V SW H/V OUT, REG CUSTMER CONTROL	A
	A

6-3. PRINTED WIRING BOARDS

– Conductor Side –

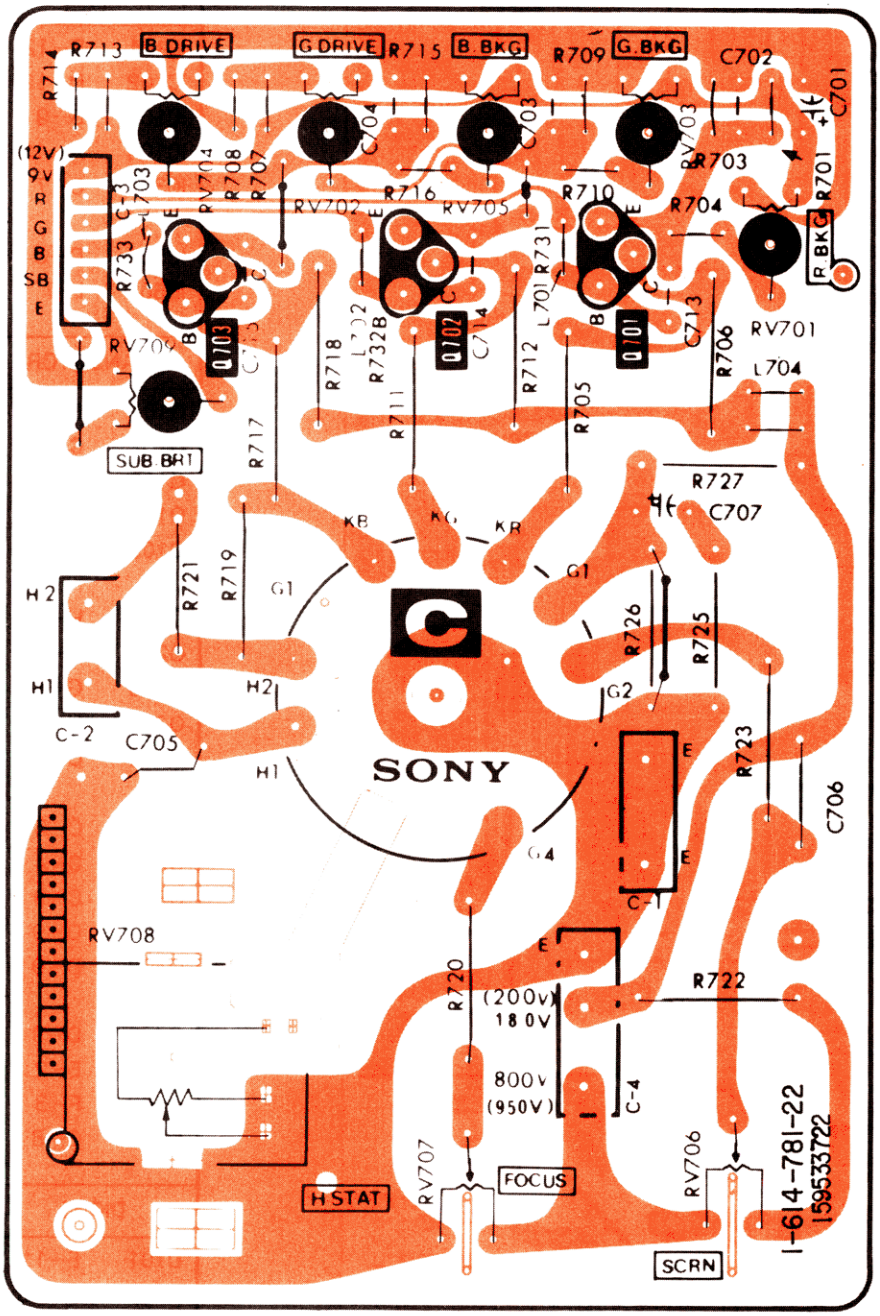
NOTE:
The circuit indicated as left contains high voltage of over 600 Vp-p. Care must be paid to prevent an electric shock in inspection or repairing.

– A Board –



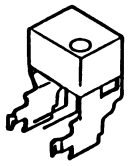
IC			
IC101	B–12	D241	H–7
IC102	D–12	D251	C–3
IC103	B–9	D301	B–6
IC104	A–13	D302	B–8
IC301	C–7	D403	D–8
		D501	D–3
IC501	D–3	D502	D–7
IC601	I–7	D503	H–9
		D504	F–4
TRANSISTOR		D505	E–4
Q101	E–8	D508	H–6
Q102	C–12	D511	I–4
Q103	C–13	D512	H–2
Q104	F–9	D513	H–3
Q105	E–9	D514	H–2
Q106	H–12	D601	I–9
Q205	F–9	D602	H–9
Q206	G–8	D603	I–9
Q241	H–7	D604	I–9
Q250	C–3	D605	H–11
Q251	C–5	D606	E–13
Q252	C–4	D607	H–13
Q301	C–9	D608	H–13
Q407	D–9	**VARIABLE RESISTOR**	
Q408	D–9	RV302	A–6
Q409	D–9	RV303	A–6
Q501	E–2	RV304	A–7
Q502	F–3	RV305	B–8
Q503	G–8	RV306	D–8
DIODE		RV501	C–8
D101	E–11	RV502	C–6
D102	D–13	RV503	C–2
D103	G–10	RV504	B–6
D104	A–10		
D105	A–9		
D106	A–8		
D107	A–10		
D108	A–12		
D109	E–10		
D110	A–10		

— C Board —

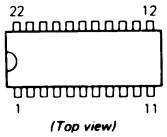

B DRIVE
G DRIVE
B BKG
G BKG
R713
R715
R709
C702
C701
R703
RV703
R704
R701
R BKG
(12V)
9V
R
G
B
SB
E
RV702
RV705
R716
R710
RV701
L704
R706
R727
C707
SUB BRT
RV709
R717
R718
R712
R705
R711
KB
KG
KR
G1
H2
H1
C-2
C705
R721
R719
R726
R725
G2
R723
C706
SONY
G4
C-1
RV708
R720
(200V)
180V
800V
(950V)
R722
C-4
H STAT
RV707
FOCUS
RV706
SCRN
1-614-781-22
159533722

6-4. SEMICONDUCTORS

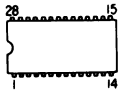
BX-1398



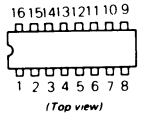
CX-7958



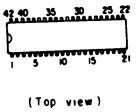
CX-20192



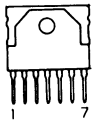
CXK1005P



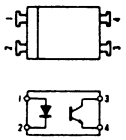
CXQ88535-119S



LA7830

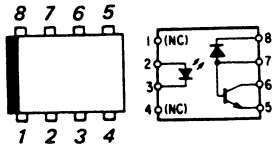


PC817-B



STR30135

TLP551



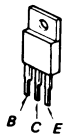
2SA933
2SC2551

2SA1013
2SC2230
2SC2383
2SC2610
2SD789

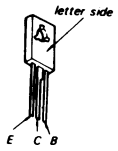
2SA1048
2SA1115
2SC1740
2SC2458
2SC2603

2SA1175
2SC2785

2SC1826
2SD313
2SD880
2SD1135
2SD1406

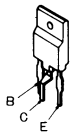


2SC2456
2SC2611
2SC2688

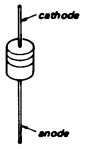


2SD774

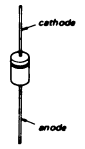
2SD1649



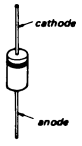
ISS119
ISS133
ISS143
RD3.6ES-L1
RD5.1ES-B2
RD5.6ES-B2
RD5.6ES-B3
RD10ES-B2
RD12ES-B2



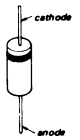
ERC24-06S



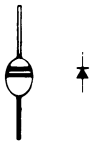
IS1555
10E2
EL1Z
ES1F
GP08DPKG23
HZ33EB2
HZ33EB2
RD5.6EBZ7
RD33EB2
RGP01-17PKG23
RGP10GPKG23
SIB01-02
SIB01-04



TVR4J-A2



U05G
V06C
V19C
V19E
V19G



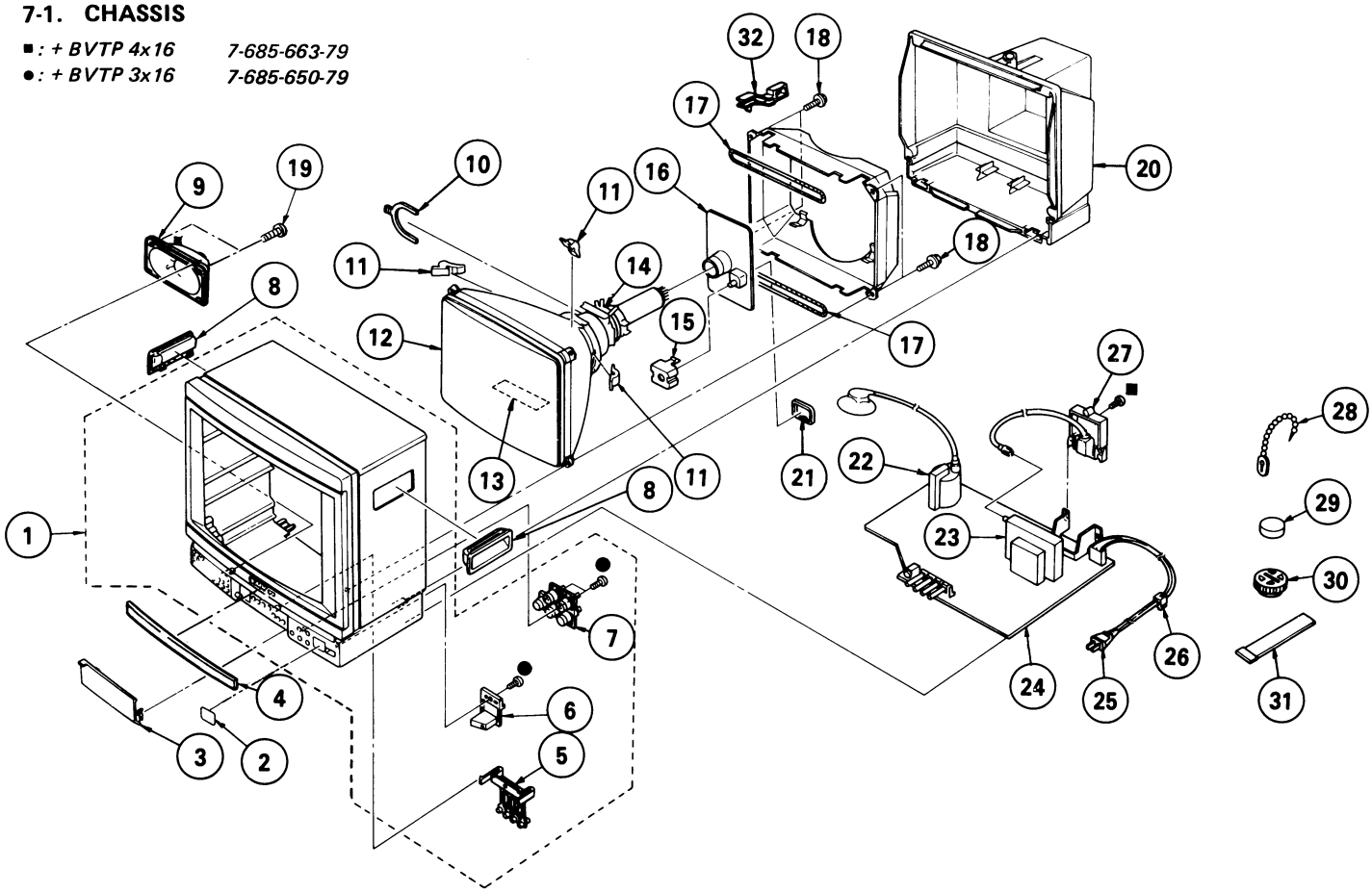
SECTION 7
EXPLODED VIEWS

NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked " ★ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

7-1. CHASSIS

■ : + BVTP 4x16 *7-685-663-79*
● : + BVTP 3x16 *7-685-650-79*



REF.NO.	PART NO.	DESCRIPTION	REMARK
1	X-4376-577-1	BEZEL ASSY	
2	*4-382-588-01	WINDOW, RAY CATCHER	
3	X-4376-575-1	DOOR ASSY, CONTROL	
4	*4-382-593-01	PLATE, ORNAMENTAL	
5	4-382-594-01	BUTTON, MULTI	
6	4-382-589-01	BUTTON, POWER	
7	4-382-596-01	BUTTON, CONTROL	
8	4-382-597-01	HANDLE	
9	1-503-787-11	SPEAKER	
10	1-452-277-00	MAGNET, BMC	
11	3-703-961-00	SPACER, DY	
12	⚠ 8-735-553-75	PICTURE TUBE (A34JBU10X)	
13	4-372-556-11	CLOTH, BLOTTING	
14	⚠ 1-451-234-12	DEFLECTION YOKE (SY-125A)	
15	*4-374-912-01	COVER (MAIN), CV VOL	
16	*A-1330-601-A	C BOARD, COMPLETE	2,4-7
17	⚠ 1-426-146-51	COIL, DEMAGNETIZATION	
18	4-307-249-00	SCREW, TAPPING (5X20)	
19	4-302-428-00	HEAD, WASHER, TAPPING SCREW	
20	4-382-598-21	COVER, REAR	
21	*4-374-913-01	COVER (REAR LID), CV VOL	
22	⚠ 1-439-314-22	TRANSFORMER ASSY, FLYBACK	
23	⚠ 1-463-771-11	TUNER, ET (BTP-201A)	
24	*A-1296-261-A	A BOARD, COMPLETE	
25	⚠ 1-559-396-11	CORD, POWER	
26	⚠ 4-022-115-01	HOLDER, AC CORD	
27	⚠ 1-536-923-21	TERMINAL BOARD ASSY, ANTENNA	
28	4-308-870-00	CLIP, LEAD WIRE	
29	1-452-032-00	MAGNET, DISK; 10MMφ	
30	1-452-094-00	MAGNET, ROTATABLE DISK; 15MMφ	
31	X-4309-608-0	PARMALLOY ASSY, CONVERGENCE	
32	*4-346-339-00	HOLDER, HV CABLE	

SECTION 8
ELECTRICAL PARTS LIST

A

NOTE:

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS
- All resistors are in ohms
- F : nonflammable

When indicating parts by reference number, please include the board name.

CAPACITORS
- MF : μF, PF : μμF

COILS
- MMH : mH, UH : μH

- The components identified by ⊠ in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.

REF.NO.	PART NO.	DESCRIPTION				REMARK
	*A-1296-261-A	A BOARD, COMPLETE				
		**********				
	1-507-678-00	JACK				
	*1-508-766-00	4P PLUG (M)				
	*1-566-058-11	PIN, CONNECTOR 6P				
	*4-363-404-00	HOLDER, IC				
		[CONNECTOR]				
A1	*1-506-348-XX	PIN, CONNECTOR 3P				
A2	*1-508-786-00	2P PLUG (M)				
A3	*1-564-038-00	CONNECTOR PLUG, DY (MINI) 6P				
A4	*1-508-765-00	3P PLUG (M)				
A5	*1-508-786-00	2P PLUG (M)				
A7	*1-566-056-11	PIN, CONNECTOR 4P				
A8	*1-508-786-00	2P PLUG (M)				
		[CAPACITOR]				
C101	1-162-285-31	CERAMIC	180PF	10%	50V	
C102	1-162-285-31	CERAMIC	180PF	10%	50V	
C103	1-123-330-00	ELECT	22MF	20%	16V	
C104	1-162-285-31	CERAMIC	180PF	10%	50V	
C105	1-162-217-31	CERAMIC	56PF	5%	50V	
C106	1-162-215-31	CERAMIC	47PF	5%	50V	
C107	1-124-443-00	ELECT	100MF	20%	10V	
C108	1-124-902-00	ELECT	0.47MF	20%	50V	
C109	1-124-463-00	ELECT	0.1MF	20%	50V	
C110	1-124-463-00	ELECT	0.1MF	20%	50V	
C111	1-162-290-31	CERAMIC	470PF	10%	50V	
C112	1-124-963-11	ELECT	33MF	20%	16V	
C113	1-162-285-31	CERAMIC	180PF	10%	50V	
C114	1-162-282-31	CERAMIC	100PF	10%	50V	
C115	1-162-286-31	CERAMIC	220PF	10%	50V	
C116	1-124-927-11	ELECT	4.7MF	20%	50V	
C117	1-124-925-11	ELECT	2.2MF	20%	50V	
C119	1-161-379-00	CERAMIC	0.01MF	30%	16V	
C120	1-162-288-31	CERAMIC	330PF	10%	50V	
C121	1-162-288-31	CERAMIC	330PF	10%	50V	
C122	1-124-963-11	ELECT	33MF	20%	16V	
C123	1-162-215-31	CERAMIC	47PF	5%	50V	
C124	1-123-380-00	ELECT	1MF	20%	50V	
C125	1-161-377-00	CERAMIC	0.0047MF	30%	16V	
C126	1-124-927-11	ELECT	4.7MF	20%	50V	
C127	1-161-375-00	CERAMIC	0.0022MF	30%	16V	
C128	1-126-101-11	ELECT	100MF	20%	16V	
C129	1-123-332-00	ELECT	47MF	20%	16V	
C130	1-123-356-00	ELECT	10MF	20%	16V	
C131	1-126-101-11	ELECT	100MF	20%	16V	
C132	1-162-286-31	CERAMIC	220PF	10%	50V	
C133	1-161-375-00	CERAMIC	0.0022MF	30%	16V	
C134	1-126-101-11	ELECT	100MF	20%	16V	
C135	1-162-284-31	CERAMIC	150PF	10%	50V	
C136	1-161-379-00	CERAMIC	0.01MF	30%	16V	
C137	1-126-101-11	ELECT	100MF	20%	16V	
C139	1-161-379-00	CERAMIC	0.01MF	30%	16V	
C140	1-126-101-11	ELECT	100MF	20%	16V	
C141	1-162-294-31	CERAMIC	0.001MF	10%	50V	
C143	1-161-379-00	CERAMIC	0.01MF	30%	16V	
C144	1-161-494-00	CERAMIC	0.022MF		25V	
C217	1-124-120-11	ELECT	220MF	20%	16V	
C231	1-123-380-00	ELECT	1MF	20%	50V	
C241	1-123-332-00	ELECT	47MF	20%	16V	
C249	1-162-288-31	CERAMIC	330PF	10%	50V	
C250	1-124-927-11	ELECT	4.7MF	20%	50V	
C251	1-101-810-00	CERAMIC	100PF	5%	500V	
C252	1-124-927-11	ELECT	4.7MF	20%	100V	
C254	1-124-046-00	ELECT	10MF	20%	160V	
C257	1-161-375-00	CERAMIC	0.0022MF	30%	16V	
C258	1-161-374-11	CERAMIC	0.0015MF	30%	16V	
C303	1-124-120-11	ELECT	220MF	20%	16V	
C304	1-123-330-00	ELECT	22MF	20%	16V	
C305	1-124-925-11	ELECT	2.2MF	20%	50V	
C306	1-161-379-00	CERAMIC	0.01MF	30%	16V	
C307	1-124-925-11	ELECT	2.2MF	20%	50V	
C308	1-162-217-31	CERAMIC	56PF	5%	50V	
C311	1-136-169-00	FILM	0.22MF	5%	50V	
C314 ⚠	1-162-300-21	CERAMIC	0.01MF	30%	16V	
C401	1-162-318-11	CERAMIC	0.001MF	10%	500V	
C402	1-124-120-11	ELECT	220MF	20%	25V	
C403	1-126-101-11	ELECT	100MF	20%	16V	
C405	1-123-332-00	ELECT	47MF	20%	16V	
C406	1-162-284-31	CERAMIC	150PF	10%	50V	
C408	1-123-330-00	ELECT	22MF	20%	16V	
C410	1-123-380-00	ELECT	1MF	20%	50V	
C419	1-124-120-11	ELECT	220MF	20%	16V	
C421	1-162-197-31	CERAMIC	6.8PF	10%	50V	
C422	1-123-380-00	ELECT	1MF	20%	50V	
C423	1-123-380-00	ELECT	1MF	20%	50V	
C424	1-123-380-00	ELECT	1MF	20%	50V	
C425	1-136-162-00	MYLAR	0.056MF	10%	50V	
C427	1-123-330-00	ELECT	22MF	20%	16V	
C430	1-126-101-11	ELECT	100MF	20%	16V	
C431	1-124-284-00	ELECT	10MF	20%	16V	
C451 ⚠	1-161-953-51	CERAMIC	0.0047MF	20%	400V	
C501	1-126-101-11	ELECT	100MF	20%	16V	
C502	1-124-927-11	ELECT	4.7MF	20%	50V	
C503	1-123-330-00	ELECT	22MF	20%	16V	
C505	1-106-355-12	MYLAR	0.0033MF	10%	100V	
C506	1-123-330-00	ELECT	22MF	20%	16V	
C507	1-162-282-31	CERAMIC	100PF	10%	50V	
C508	1-162-288-31	CERAMIC	330PF	10%	50V	

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The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

REF.NO.	PART NO.	DESCRIPTION			REMARK
C509	1-102-030-00	CERAMIC	330PF	10%	500V
C515 ⚠	1-102-212-91	CERAMIC	820PF	10%	500V
C518	1-124-929-11	ELECT	22MF	20%	100V
C519	1-124-494-00	ELECT	33MF		160V
C520 ⚠	1-162-115-51	CERAMIC	330PF	10%	2KV
C521	1-106-369-00	MYLAR	0.012MF	10%	100V
C522 ⚠	1-136-063-11	FILM	0.0055MF	3%	1.4KV
C523	1-123-932-00	ELECT	4.7MF	20%	160V
C524	1-123-356-00	ELECT	10MF	20%	16V
C525	1-123-875-11	ELECT	10MF	20%	50V
C528	1-136-136-00	FILM	0.24MF	5%	200V
C529	1-162-114-00	CERAMIC	0.0047MF	10%	2KV
C530	1-124-484-11	ELECT	220MF	20%	35V
C531	1-124-927-11	ELECT	4.7MF	20%	50V
C541	1-102-030-00	CERAMIC	330PF	10%	500V
C542	1-130-481-00	MYLAR	0.0068MF	10%	50V
C543	1-124-122-11	ELECT	100MF	20%	35V
C544	1-124-119-00	ELECT	330MF	20%	16V
C545	1-124-119-00	ELECT	330MF	20%	16V
C546	1-123-332-00	ELECT	47MF	20%	16V
C547	1-162-294-31	CERAMIC	0.001MF	10%	50V
C551	1-102-212-00	CERAMIC	820PF	10%	500V
C552	1-124-479-11	ELECT	330MF	20%	25V
C555	1-101-810-00	CERAMIC	100PF	5%	500V
C556	1-102-978-00	CERAMIC	220PF	10%	50V
C560	1-123-332-00	ELECT	47MF	20%	16V
C601 ⚠	1-108-745-52	MYLAR	0.22MF	20%	125V
C602	1-124-959-11	ELECT	330MF	20%	200V
C603	1-124-046-00	ELECT	10MF	20%	160V
C604	1-124-046-00	ELECT	10MF	20%	160V
C614	1-123-948-00	ELECT	22MF	20%	250V
C615	1-161-830-00	CERAMIC	0.0047MF		500V
C616	1-124-443-00	ELECT	100MF	20%	10V

(DIODE)

D101	8-719-815-55	DIODE 1S1555	
D102	8-719-109-74	DIODE RD4.3ES-B1	
D103	8-719-101-04	DIODE RD33E-B2	
D104	8-719-815-55	DIODE 1S1555	
D105	8-719-815-55	DIODE 1S1555	
D106	8-719-815-55	DIODE 1S1555	
D107	8-719-815-55	DIODE 1S1555	
D108	1-807-745-11	LED UNIT (LEDU-4)	
D109	8-719-815-55	DIODE 1S1555	
D241	8-719-110-17	DIODE RD10ES-B2	
D251	8-719-815-55	DIODE 1S1555	
D301	8-719-200-02	DIODE 10E2	
D302	8-719-109-89	DIODE RD5.6ES-B2	
D401	8-719-924-06	DIODE ERC24-06S	
D402	8-719-815-55	DIODE 1S1555	
D403	8-719-815-55	DIODE 1S1555	
D405	8-719-110-31	DIODE RD12ES-B2	
D501	8-719-936-83	DIODE GP08DPKG23	
D502	8-719-100-35	DIODE RD5.6E-B2	
D503	8-719-109-90	DIODE RD5.6ES-B3	
D504	8-719-936-83	DIODE GP08DPKG23	
D505	8-719-936-83	DIODE GP08DPKG23	
D508	8-719-918-77	DIODE V19G	
D511 ⚠	8-719-924-06	DIODE ERC24-06S	
D512 ⚠	8-719-302-43	DIODE EL1Z-V1	
D513	8-719-300-65	DIODE ES1F	
D514 ⚠	8-719-918-77	DIODE V19G	
D601 ⚠	8-719-801-70	DIODE TVR4J	
D602 ⚠	8-719-801-70	DIODE TVR4J	
D603 ⚠	8-719-801-70	DIODE TVR4J	
D604 ⚠	8-719-801-70	DIODE TVR4J	
D605 ⚠	8-719-200-02	DIODE 10E2	
D606	8-719-109-85	DIODE RD5.1ES-B2	
D607	8-719-911-55	DIODE U05G	
D608	8-719-911-55	DIODE U05G	

(FUSE)

F601 ⚠	1-532-509-11	FUSE, GLASS TUBE 6.3A/125V	
	1-533-190-11	CLIP, FUSE; F601	
F602 ⚠	1-532-740-11	FUSE, GLASS TUBE 1A/125V	
	*1-533-189-11	HOLDER, FUSE; F602	

(IC)

IC101	8-759-918-29	IC CXQ88535-119S	
IC102	8-759-909-50	IC CX-7958	
IC103	8-752-321-18	IC CXK1005P	
IC104	8-741-139-80	IC BX-1398	
IC301 ⚠	8-752-019-20	IC CX20192	
IC401 ⚠	8-719-800-43	DIODE TLP551	
IC402 ⚠	8-719-936-96	PC817-B	
IC403	8-759-140-66	IC UPD4066BC	
IC501	8-759-801-98	IC LA7830	
IC601 ⚠	8-749-901-35	IC STR30135	

(IF BLOCK)

IF201	1-464-478-11	IF BLOCK (IFB-450)	

(COIL)

L101	1-410-119-11	INDUCTOR	1MMH
L102	1-404-538-11	COIL	
L103	1-408-420-00	INDUCTOR	82UH
L104	1-408-409-00	INDUCTOR	10UH
L104	1-410-470-11	INDUCTOR	10UH
L105	1-408-407-00	INDUCTOR	6.8UH
L106	1-408-405-00	INDUCTOR	4.7UH
L107	1-408-609-41	INDUCTOR	33UH
L107	1-410-331-11	INDUCTOR	33UH
L110	1-410-322-11	INDUCTOR	3.3UH
L251	1-408-408-00	INDUCTOR	8.2UH
L301	1-408-609-41	INDUCTOR	33UH
L401	1-408-408-00	INDUCTOR	8.2UH
L501	1-407-365-00	COIL, CHOKE	
L504	1-410-665-31	INDUCTOR	15UH
L513 ⚠	1-407-699-11	INDUCTOR	33UH
L515	1-410-065-11	INDUCTOR	3.3MMH
L601 ⚠	1-408-225-11	INDUCTOR	3.3UH
L602 ⚠	1-408-225-11	INDUCTOR	3.3UH

(TRANSISTOR)

Q101	8-729-178-54	TRANSISTOR 2SC2785	
Q102	8-729-117-54	TRANSISTOR 2SA1175	
Q103	8-729-178-54	TRANSISTOR 2SC2785	
Q104	8-729-178-54	TRANSISTOR 2SC2785	
Q105	8-729-178-54	TRANSISTOR 2SC2785	
Q106	8-729-255-12	TRANSISTOR 2SC2551	
Q205	8-729-117-54	TRANSISTOR 2SA1175	
Q206	8-729-117-54	TRANSISTOR 2SA1175	
Q241	8-729-382-64	TRANSISTOR 2SC1826-G	

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The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

REF.NO.	PART NO.	DESCRIPTION	REMARK
Q250	8-729-238-32	TRANSISTOR 2SC2383-O	
Q251	8-729-201-32	TRANSISTOR 2SA1013-O	
Q251	8-729-238-32	TRANSISTOR 2SC2383-O	
Q252	8-729-201-32	TRANSISTOR 2SA1013-O	
Q252	8-729-238-32	TRANSISTOR 2SC2383-O	
Q301	8-729-178-54	TRANSISTOR 2SC2785	
Q401	8-729-178-54	TRANSISTOR 2SC2785	
Q402	8-729-178-54	TRANSISTOR 2SC2785	
Q403	8-729-117-54	TRANSISTOR 2SA1175	
Q404	8-729-178-54	TRANSISTOR 2SC2785	
Q405	8-729-117-54	TRANSISTOR 2SA1175	
Q406	8-729-178-54	TRANSISTOR 2SC2785	
Q407	8-729-117-54	TRANSISTOR 2SA1175	
Q408	8-729-178-54	TRANSISTOR 2SC2785	
Q409	8-729-178-54	TRANSISTOR 2SC2785	
Q411	8-729-178-54	TRANSISTOR 2SC2785	
Q412	8-729-178-54	TRANSISTOR 2SC2785	
Q501	8-729-168-82	TRANSISTOR 2SC2688-L	
Q502	8-729-802-50	TRANSISTOR 2SD1649-CA	
Q503	8-729-177-42	TRANSISTOR 2SD774-3	

(RESISTOR)

REF.NO.	PART NO.	DESCRIPTION				REMARK
R101	1-249-433-11	CARBON	22K	5%	1/4W	
R102	1-249-414-11	CARBON	560	5%	1/4W	
R103	1-249-421-11	CARBON	2.2K	5%	1/4W	
R104	1-249-421-11	CARBON	2.2K	5%	1/4W	
R105	1-249-433-11	CARBON	22K	5%	1/4W	
R106	1-249-405-11	CARBON	100	5%	1/4W	
R107	1-249-417-11	CARBON	1K	5%	1/4W	
R108	1-249-417-11	CARBON	1K	5%	1/4W	
R109	1-249-417-11	CARBON	1K	5%	1/4W	
R110	1-249-417-11	CARBON	1K	5%	1/4W	
R111	1-249-433-11	CARBON	22K	5%	1/4W	
R112	1-249-433-11	CARBON	22K	5%	1/4W	
R113	1-249-433-11	CARBON	22K	5%	1/4W	
R114	1-249-433-11	CARBON	22K	5%	1/4W	
R115	1-249-435-11	CARBON	33K	5%	1/4W	
R116	1-249-427-11	CARBON	6.8K	5%	1/4W	
R117	1-247-883-00	CARBON	150K	5%	1/4W	
R118	1-249-431-11	CARBON	15K	5%	1/4W	
R119	1-249-404-00	CARBON	82	5%	1/4W	
R120	1-249-421-11	CARBON	2.2K	5%	1/4W	
R121	1-249-421-11	CARBON	2.2K	5%	1/4W	
R122	1-249-421-11	CARBON	2.2K	5%	1/4W	
R123	1-249-417-11	CARBON	1K	5%	1/4W	
R124	1-249-429-11	CARBON	10K	5%	1/4W	
R125	1-249-415-11	CARBON	680	5%	1/4W	
R126	1-249-421-11	CARBON	2.2K	5%	1/4W	
R127	1-249-421-11	CARBON	2.2K	5%	1/4W	
R128	1-249-421-11	CARBON	2.2K	5%	1/4W	
R129	1-247-883-00	CARBON	150K	5%	1/4W	
R130	1-247-883-00	CARBON	150K	5%	1/4W	
R131	1-249-433-11	CARBON	22K	5%	1/4W	
R132	1-249-435-11	CARBON	33K	5%	1/4W	
R133	1-249-465-11	CARBON	47K	5%	1/4W	
R134	1-249-429-11	CARBON	10K	5%	1/4W	
R135	1-249-429-11	CARBON	10K	5%	1/4W	
R136	1-249-429-11	CARBON	10K	5%	1/4W	
R137	1-249-413-11	CARBON	470	5%	1/4W	
R138	1-247-885-00	CARBON	180K	5%	1/4W	
R139	1-249-429-11	CARBON	10K	5%	1/4W	
R140	1-249-434-11	CARBON	27K	5%	1/4W	
R142	1-249-414-11	CARBON	560	5%	1/4W	
R143	1-249-414-11	CARBON	560	5%	1/4W	
R145	1-249-429-11	CARBON	10K	5%	1/4W	
R146	1-249-433-11	CARBON	22K	5%	1/4W	
R147	1-249-421-11	CARBON	2.2K	5%	1/4W	
R149	1-249-429-11	CARBON	10K	5%	1/4W	
R150	1-249-421-11	CARBON	2.2K	5%	1/4W	
R152	1-249-441-11	CARBON	100K	5%	1/4W	
R153	1-215-923-00	METAL OXIDE	10K	5%	3W	F
R154	1-249-426-11	CARBON	5.6K	5%	1/4W	
R155	1-247-883-00	CARBON	150K	5%	1/4W	
R159	1-249-427-11	CARBON	6.8K	5%	1/4W	
R160	1-249-426-11	CARBON	5.6K	5%	1/4W	
R161	1-249-425-11	CARBON	4.7K	5%	1/4W	
R162	1-249-441-11	CARBON	100K	5%	1/4W	
R165	1-249-416-11	CARBON	820	5%	1/4W	
R168	1-249-417-11	CARBON	1K	5%	1/4W	
R169	1-249-417-11	CARBON	1K	5%	1/4W	
R170	1-249-417-11	CARBON	1K	5%	1/4W	
R171	1-249-417-11	CARBON	1K	5%	1/4W	
R205	1-249-435-11	CARBON	33K	5%	1/4W	
R208	1-249-435-11	CARBON	33K	5%	1/4W	
R220	1-249-417-11	CARBON	1K	5%	1/4W	
R221	1-249-417-11	CARBON	1K	5%	1/4W	
R222	1-249-411-11	CARBON	330	5%	1/4W	
R223	1-249-440-11	CARBON	82K	5%	1/4W	
R224	1-247-891-00	CARBON	330K	5%	1/4W	
R226	1-249-429-11	CARBON	10K	5%	1/4W	
R227	1-249-421-11	CARBON	2.2K	5%	1/4W	
R228	1-249-405-11	CARBON	100	5%	1/4W	
R241	1-215-860-11	METAL OXIDE	33	5%	1W	F
R242	1-249-412-11	CARBON	390	5%	1/4W	
R250	1-249-421-11	CARBON	2.2K	5%	1/4W	
R251	1-249-417-11	CARBON	1K	5%	1/4W	
R252	1-247-881-00	CARBON	120K	5%	1/4W	
R253	1-249-492-11	CARBON	47K	5%	1/2W	
R255 ⚠	1-247-699-51	CARBON	82	5%	1/4W	F
R261	1-247-700-11	SOLID	100	5%	1/4W	
R301	1-215-461-00	METAL	47K	1%	1/6W	
R302	1-249-429-11	CARBON	10K	5%	1/4W	
R304	1-249-411-11	CARBON	330	5%	1/4W	
R305	1-249-411-11	CARBON	330	5%	1/4W	
R306	1-249-411-11	CARBON	330	5%	1/4W	
R307	1-249-439-11	CARBON	68K	5%	1/4W	
R308	1-249-434-11	CARBON	27K	5%	1/4W	
R310	1-249-427-11	CARBON	6.8K	5%	1/4W	
R311	1-249-417-11	CARBON	1K	5%	1/4W	
R314	1-249-438-11	CARBON	56K	5%	1/4W	
R315	1-249-431-11	CARBON	15K	5%	1/4W	
R316	1-249-435-11	CARBON	33K	5%	1/4W	
R317	1-249-432-11	CARBON	18K	5%	1/4W	
R320	1-249-416-11	CARBON	820	5%	1/4W	
R402	1-215-862-11	METAL OXIDE	68	5%	1W	F
R403	1-249-441-11	CARBON	100K	5%	1/4W	
R404	1-249-441-11	CARBON	100K	5%	1/4W	
R405	1-249-404-00	CARBON	82	5%	1/4W	
R406	1-249-418-11	CARBON	1.2K	5%	1/4W	
R407	1-249-405-11	CARBON	100	5%	1/4W	
R408	1-249-431-11	CARBON	15K	5%	1/4W	
R409	1-249-428-11	CARBON	8.2K	5%	1/4W	
R410	1-249-406-11	CARBON	120	5%	1/4W	
R411	1-216-428-00	METAL OXIDE	180	5%	1W	F
R415	1-249-417-11	CARBON	1K	5%	1/4W	
R416	1-247-883-00	CARBON	150K	5%	1/4W	
R417	1-247-883-00	CARBON	150K	5%	1/4W	

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The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

• The components identified by ⧓ in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.

REF.NO.	PART NO.	DESCRIPTION				REMARK
R418	1-249-417-11	CARBON	1K	5%	1/4W	
R420	1-249-431-11	CARBON	15K	5%	1/4W	
R421	1-249-405-11	CARBON	100	5%	1/4W	
R422	1-249-418-11	CARBON	1.2K	5%	1/4W	
R423	1-249-405-11	CARBON	100	5%	1/4W	
R425	1-249-409-11	CARBON	220	5%	1/4W	
R426	1-249-429-11	CARBON	10K	5%	1/4W	
R427	1-249-441-11	CARBON	100K	5%	1/4W	
R428	1-249-433-11	CARBON	22K	5%	1/4W	
R429	1-249-429-11	CARBON	10K	5%	1/4W	
R430	1-249-417-11	CARBON	1K	5%	1/4W	
R431	1-249-421-11	CARBON	2.2K	5%	1/4W	
R432	1-249-417-11	CARBON	1K	5%	1/4W	
R433	1-247-887-00	CARBON	220K	5%	1/4W	
R434	1-249-418-11	CARBON	1.2K	5%	1/4W	
R435	1-202-730-00	SOLID	8.2M	10%	1/2W	
R436	1-249-423-11	CARBON	3.3K	5%	1/4W	
R437	1-249-429-11	CARBON	10K	5%	1/4W	
R438	1-249-417-11	CARBON	1K	5%	1/4W	
R439	1-249-429-11	CARBON	10K	5%	1/4W	
R440	1-249-417-11	CARBON	1K	5%	1/4W	
R441	1-249-421-11	CARBON	2.2K	5%	1/4W	
R445	1-249-417-11	CARBON	1K	5%	1/4W	
R448	1-249-421-11	CARBON	2.2K	5%	1/4W	
R451 ⚠	1-202-727-51	SOLID	4.7M	10%	1/2W	
R501	1-215-480-00	METAL	300K	1%	1/6W	
R502	1-216-484-00	METAL OXIDE	3.9K	5%	3W	F
R503	1-216-484-00	METAL OXIDE	3.9K	5%	3W	F
R505	1-249-459-11	CARBON	12K	5%	1/4W	F
R506	1-249-423-11	CARBON	3.3K	5%	1/4W	
R507	1-249-423-11	CARBON	3.3K	5%	1/4W	
R508	1-249-405-11	CARBON	100	5%	1/4W	
R509	1-216-454-11	METAL OXIDE	390	5%	2W	F
R510	1-249-427-11	CARBON	6.8K	5%	1/4W	
R511	1-249-423-11	CARBON	3.3K	5%	1/4W	
R512	1-215-865-11	METAL OXIDE	220	5%	1W	F
R513	1-215-865-11	METAL OXIDE	220	5%	1W	F
R514	1-247-717-11	CARBON	2.2K	5%	1/4W	F
R516	1-215-863-11	METAL OXIDE	100	5%	1W	F
R517	1-249-417-11	CARBON	1K	5%	1/4W	
R518 ⚠	1-216-434-51	METAL OXIDE	1.8K	5%	1W	F
R519	1-247-706-11	CARBON	330	5%	1/4W	
R520 ⚠	1-249-447-51	CARBON	1	5%	1/4W	F
R521 ⚠	1-249-449-51	CARBON	1.5	5%	1/4W	F
R522	1-215-449-00	METAL	15K	1%	1/6W	
R525 ⚠	1-216-484-51	METAL OXIDE	3.9K	5%	3W	F
R526	1-247-883-00	CARBON	150K	5%	1/4W	
R527	1-214-915-00	METAL	120K	1%	1/2W	
R528	1-247-722-11	CARBON	5.6K	5%	1/4W	
R529	1-247-719-11	CARBON	3.3K	5%	1/4W	F
R530	1-249-413-11	CARBON	470	5%	1/4W	
R533 ⚠	1-249-449-51	CARBON	1.5	5%	1/4W	F
R534	1-249-495-11	CARBON	82K	5%	1/2W	
R535	1-247-713-11	CARBON	1K	5%	1/4W	
R536	1-247-725-11	CARBON	10K	5%	1/4W	
R537	1-216-426-11	METAL OXIDE	82	5%	1W	F
R538	1-249-414-11	CARBON	560	5%	1/4W	
R539	1-249-417-11	CARBON	1K	5%	1/4W	
R540	1-249-437-11	CARBON	47K	5%	1/4W	
R541	1-249-404-00	CARBON	82	5%	1/4W	
R542	1-249-410-11	CARBON	270	5%	1/4W	
R543	1-216-349-00	METAL OXIDE	1	5%	1W	F
R544	1-247-714-11	CARBON	1.2K	5%	1/4W	
R545	1-249-424-11	CARBON	3.9K	5%	1/4W	
R546 ⚠	1-247-845-91	CARBON	100	5%	1/4W	F
R550	1-249-412-11	CARBON	390	5%	1/4W	
R551	1-216-379-11	METAL OXIDE	6.8	5%	2W	F
R567	1-215-439-00	METAL	5.6K	1%	1/6W	
⧓R568 ⚠		METAL			1/4W	
R569	1-214-765-00	METAL	33K	1%	1/4W	
R601 ⚠	1-202-719-51	SOLID	1M	10%	1/2W	
R602 ⚠	1-205-707-12	WIREWOUND	2.2	5%	10W	
R603 ⚠	1-216-373-51	METAL OXIDE	2.2	5%	2W	F
R604	1-215-899-11	METAL OXIDE	15K	5%	2W	F
R605	1-247-756-11	CARBON	2.2K	5%	1/2W	
R606 ⚠	1-205-907-11	WIREWOUND	200	5%	20W	
R613 ⚠	1-207-474-11	WIREWOUND	8.2	10%	1/2W	
R614 ⚠	1-205-744-11	WIREWOUND	4.7K	5%	20W	
R615 ⚠	1-215-895-51	METAL OXIDE	3.3K	5%	2W	F

{ VARIABLE RESISTOR }

RV302	1-237-595-11	RES, VAR, CARBON (SW) 20KX3
RV303	1-237-595-11	RES, VAR, CARBON (SW) 20KX3
RV304	1-237-595-11	RES, VAR, CARBON (SW) 20KX3
RV305	1-228-998-00	RES, ADJ, CARBON 220K
RV306	1-228-992-11	RES, ADJ, CARBON 3.3K
RV401	1-228-994-00	RES, ADJ, CARBON 10K
RV402	1-228-990-00	RES, ADJ, CARBON 1K
RV501	1-228-728-00	RES, ADJ, CERAMIC CARBON 100K
RV502	1-228-996-00	RES, ADJ, CARBON 47K
RV503	1-228-993-00	RES, ADJ, CARBON 4.7K
RV504	1-228-994-00	RES, ADJ, CARBON 10K

{ RERAY }

RY601 ⚠	1-515-573-11	RELAY, POWER

{ SWITCH }

S101	1-554-088-00	SWITCH, KEY BOARD
S102	1-554-088-00	SWITCH, KEY BOARD
S103	1-554-088-00	SWITCH, KEY BOARD
S104	1-570-577-11	SWITCH, PUSH
S105	1-570-577-11	SWITCH, PUSH
S107	1-554-088-00	SWITCH, KEY BOARD
S108	1-554-088-00	SWITCH, KEY BOARD
S109	1-570-577-11	SWITCH, PUSH
S110	1-570-577-11	SWITCH, PUSH
S111 ⚠	1-554-088-31	SWITCH, KEY BOARD
S113	1-237-595-11	RES, VAR, CARBON (SW) 20KX3
S113	1-237-595-11	RES, VAR, CARBON (SW) 20KX3
S501	1-554-186-00	SWITCH, LEVER

{ TRANSFORMER }

T251 ⚠	1-427-530-12	TRANSFORMER, OUTPUT
T401 ⚠	1-421-857-11	TRANSFORMER, FERRITE
T501	1-437-090-00	HDT
T503 ⚠	1-439-314-22	TRANSFORMER ASSY, FLYBACK
T601 ⚠	1-421-935-12	L.F.T

{ THERMISTOR }

TH301	1-807-796-11	THERMISTOR
THP601 ⚠	1-800-686-51	THERMISTOR (POSITIVE)

A C

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

REF.NO.	PART NO.	DESCRIPTION				REMARK
		(TUNER)				
TU101⚠	1-463-771-11	TUNER, ET (BTP-201A)				
		(CRYSTAL)				
X301	1-567-505-11	OSCILLATOR, CRYSTAL				
		**********				
	*A-1330-601-A	C BOARD, COMPLETE				
		**********				
	1-526-819-11	SOCKET, PICTURE TUBE				
	*4-374-912-01	COVER (MAIN), CV VOL				
	*4-374-913-01	COVER (REAR LID), CV VOL				
		(CONNECTOR)				
C1	*1-506-371-00	PIN, CONNECTOR 2P				
C2	*1-508-786-00	2P PLUG (M)				
C3	*1-566-058-11	PIN, CONNECTOR 6P				
C4	*1-508-765-00	3P PLUG (M)				
		(CAPACITOR)				
C705	1-162-116-00	CERAMIC	680PF	10%	2KV	
C706	1-130-338-11	FILM	0.01MF	10%	630V	
		(COIL)				
L701	1-408-420-00	INDUCTOR	82UH			
L702	1-408-420-00	INDUCTOR	82UH			
L703	1-408-420-00	INDUCTOR	82UH			
L704	1-408-424-00	INDUCTOR	180UH			
		(TRANSISTOR)				
Q701	8-729-326-11	TRANSISTOR 2SC2611				
Q702	8-729-326-11	TRANSISTOR 2SC2611				
Q703	8-729-326-11	TRANSISTOR 2SC2611				
		(RESISTOR)				
R701	1-249-421-11	CARBON	2.2K	5%	1/4W	
R703	1-249-412-11	CARBON	390	5%	1/4W	
R704	1-249-422-11	CARBON	2.7K	5%	1/4W	
R705	1-202-824-00	SOLID	3.3K	10%	1/2W	
R706	1-215-899-11	METAL OXIDE	15K	5%	2W	F
R707	1-249-418-11	CARBON	1.2K	5%	1/4W	
R708	1-249-413-11	CARBON	470	5%	1/4W	
R709	1-249-415-11	CARBON	680	5%	1/4W	
R710	1-249-422-11	CARBON	2.7K	5%	1/4W	
R711	1-202-824-00	SOLID	3.3K	10%	1/2W	
R712	1-215-899-11	METAL OXIDE	15K	5%	2W	F
R713	1-249-418-11	CARBON	1.2K	5%	1/4W	
R714	1-249-413-11	CARBON	470	5%	1/4W	
R715	1-249-415-11	CARBON	680	5%	1/4W	
R716	1-249-422-11	CARBON	2.7K	5%	1/4W	
R717	1-202-824-00	SOLID	3.3K	10%	1/2W	
R718	1-215-899-11	METAL OXIDE	15K	5%	2W	F
R719	1-202-842-11	SOLID	220K	10%	1/2W	
R720	1-202-719-00	SOLID	1M	10%	1/2W	
R721 ⚠	1-216-348-51	METAL OXIDE	0.82	5%	1W	F
R722	1-202-848-00	SOLID	680K	10%	1/2W	
R723	1-202-838-00	SOLID	100K	10%	1/2W	
		(VARIABLE RESISTOR)				
RV701	1-228-723-00	RES, ADJ, CERAMIC CARBON 4.7K				
RV702	1-228-722-00	RES, ADJ, CERAMIC CARBON 3.3K				
RV703	1-228-723-00	RES, ADJ, CERAMIC CARBON 4.7K				
RV704	1-228-722-00	RES, ADJ, CERAMIC CARBON 3.3K				
RV705	1-228-723-00	RES, ADJ, CERAMIC CARBON 4.7K				
RV706	1-230-641-11	RES, ADJ, METAL GLAZE 2.2M				
RV707	1-230-641-11	RES, ADJ, METAL GLAZE 2.2M				
RV708⚠	1-230-798-11	RES, ADJ, METAL GLAZE 90M				
RV709	1-228-725-00	RES, ADJ, CERAMIC CARBON 22K				
		**********				
		MISCELLANEOUS				
		**********				
	⚠ 1-536-923-21	TERMINAL BOARD ASSY, ANTENNA				
	⚠ 1-559-396-11	CORD, POWER				
L903 ⚠	1-426-146-51	COIL, DEMAGNETIZATION				
SP901	1-503-787-11	SPEAKER				
V901 ⚠	8-735-553-75	PICTURE TUBE (A34JBU10X)				
		**********				
		ACCESSORIES AND PACKING MATERIALS				
		**********				

PART NO.	DESCRIPTION	REMARK
A-1470-695-A	COMMANDER ASSY (RM-729)	
1-501-284-00	ANTENNA, TELESCOPIC	
1-562-443-11	CONNECTOR, ANTENNA	
*4-378-262-01	BAG, PROTECTION	
*4-385-015-01	CUSHION (UPPER) (ASSY)	
*4-385-016-01	CUSHION (LOWER) (ASSY)	
*4-385-067-01	INDIVIDUAL CARTON	
4-482-387-21	MANUAL, INSTRUCTION	

9-964-106-01

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